

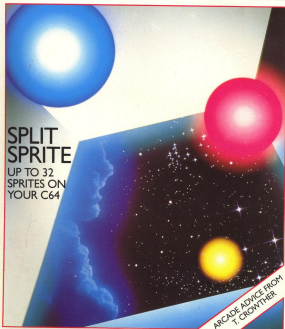
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AN ARGUS SPECIALIST PUBLICATION

APRIL 1987 £1.15

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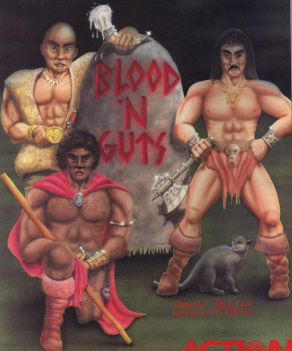
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# GRANGE HILL— THE GAME



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Available for Spectrum,  
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# DATA STATEMENTS

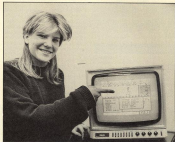
## APS at School

Argus Press Software is soon to release the official Orange Hill game, entitled *Orange Hill - the Computer Game*. Spin off of the long running TV series about a comprehensive school, the game casts you in the part of Luke 'Gonch' Gardner.

The scenario is the darkened school, closed for the night. However, within the confines of the staff room, lies your Walkman, confiscated earlier during class. You cannot return without it for fear of the wrath of your master. So, you have to get it back. What better idea than to break into the school after everyone else has left, find your way to the staffroom and claim your lost property? Well, it may sound a little far-fetched but that's the general idea.

With the aid of your pal, Hello Holloway (presumably supporting this scheme because he has even less brains than you), you aim to complete your dirty deed by midnight otherwise your skins will go spare.

This adventure has a large number of locations and contains arcade elements as you guide the characters with the keyboard or joystick. It should be in the shops now and is



*Billy Smith*

£9.95 on cassette.

Also look out for these other titles, coming soon on APS labels: *Wizards*, *Argus Orange Circus Maximus*, *World War One*, *Avellar Refrains*, *Roundheads* and *The Hunt for Red*

*Overlord*. All are for the C64.

### Touchline

**Argus Press Software** Pirney House, Lutterbury Place, London WC2M 7JL. Tel: 01 475 6665.

## Miscellaneous Software

Finally a look at a few games winging their way to your local shops even as we speak.

**Enlighted** is releasing a new level 9 adventure for the C64 entitled *Knights One*. It casts you as an oppressed one intent on getting your own back on the humans who have subjugated your people for generations. State of the art digitised graphics are an impressive visual feature of the new adventure. Out soon.

**Anatomy**, from CKL, is due to be launched for the C64 in the spring. Continuing the theme of *Tom Cat*, Anatomy enrolls you in the top secret training school of the Galscop for skimmer pilots. You have to learn to design your own space ship, and participate in all the classes needed to qualify to become a full fledged skimmer pilot. It will be available on



cassette and disk at £9.95 and £14.95 respectively.

**Airbush** has a bargain package for the C16. *Fold Runner* and *Rollpaw* is a two-games-in-one cassette for only £5.95.

Also from Airbush is *Killer King*, the latest Tony Crowther game on Commodore 64 cassette (£9.95) and

disk (£12.99). The inlay card features a special recipe for K-Ring cup cakes.

**Blitzkrieg**, a C64 game based on the Lee Deighton thriller of the same name, will also be available for the C64 from Airbush in the near future. Based on the assault against Britain in World War Two, you lead the German forces in a game of strategy and action.

C16 users are still being supported handsomely by Grenada, and a new release for this machine is en route to the shelves. *The Way of the Tiger*, based on the fighting fantasy series of books of the same name, combines strategy, action and unique animation. It features three action packed levels 'superb sound effects and inspiring backdrops'. Yours for £9.95.

### Touchline

**Relished** First Floor, 74 New Oxford



Street, London WC1A 1PS. Tel: 01 240 8838.

CLB: CLB House, 9 Kings Ford, Coppeners Road, London E11 2DD. Tel: 01 320 1941.

Adhema: 48 Long Arch, Caversham Garden, London W42E 6SW. Tel: 01 826 3411.

Granville Alpha House, 16 Carver Street, Sheffield S1 4PS. Tel: 0742 754429.

## Links On Line

**W**ho says computer owners aren't romantic at heart? News has recently come in of the first online engagement on *Compuserf*.

The couple are Paul Harrell and Margaret Marthory. They were introduced by Carol, Margaret's mother. She said "I was chatting to Paul on Party-Line at Christmas and he sounded a bit drowsy, so I thought Margaret-online to cheer him up".

A five hour party-line session led to a phone call and then Paul made the journey from his home town in Wiltshire near Brindon, to Leeds, Margaret's home, where they met face to face for the first time. Soon afterwards Margaret surprised her family with a diamond and sapphire engagement ring. The couple plan to marry in about two years.

Margaret's father Chris said: "When I bought a modern, I didn't bargain for a wedding".

Paul summed up the couple's feelings about their romance: "It's thanks to *Compuserf*. Living 248 miles apart, we'd never have met if it hadn't been for Party-Line".

On to the more serious aspect of communications, BT's Electronic Yellow Pages (EYP) went live in early January, allowing most online communicating terminals in the UK and abroad free access to a database of Yellow Pages advertisers.

Initial information covers the whole of London, Reading, Guildford, Watford and St Albans.

In areas where the 1987 edition of Yellow Pages are not available until later in the year, users interested should ring the EYP Helpline (see Touchline) for a free copy of the user instructions.

Touchline  
Compuserf: 01 945 8866.  
EYP Helpline: 0744 566256

## Sports Pick

New from Appleton is an American's Cup game, simply and appropriately named *Sailing*.

It's a game of strategy and simulation designed to capture the thrill of competing in top level sailing competitions. Even before you start sailing you have to design the boat that will get you across the finishing line first.

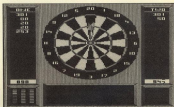
You can choose overall length, waterline length, freeboard and mast length as well as adding wings to your keel and changing the hull material. Once you've suited this out and made your allegiance to a particular nation then you're ready to compete.

The display is split into two halves, the top shows the view out over the sea, so that you can see if your

opponent is ahead. The bottom contains your gauges which you need to monitor closely to get the best from your boat. It's available for the Cbm/128 at £9.99 cassette and £14.95 disk.

Four sports games in one are available from Advance Promotions in the form of a new release entitled *Indoor Sports*. The four sports featured on the cassette for Cbm are *15 Pin Bowling*, *Air Hockey*, *Table Tennis* and *Darts*. The Commodore 64 version is £8.85 and Advance claims that all the games could stand alone at full price.

Touchline  
*Atkinson*: 21 Ford St, Harpenden, London, HWD 2PN Tel: 01 431 1801  
*Advances*: 17 Staple Tye, Harlow, Essex CM9 7LE Tel: 0279 412441.



Indoor Sports



## Packet Money

A new range of budget games has recently been launched by Midas Marketing. There are two initial releases on the new label: *X29 Fighter Mission* for the C64 and *Space 2* for the C16. Both are priced at £2.99.

*X29 Fighter Mission* is essentially a flight and combat simulator. Your fighter must be flown with skill and dexterity to avoid the constant onslaught of enemy fire and heat seeking missiles. At the same time you must concentrate on destroying the enemy craft.

*Space 2* is a combination of shoot 'em up action and skill and nerve in manoeuvring a large space craft through dark caverns. There are two programs on *Space 2*. The first *Galaxy*, involves a lost starship trying to return to the main ship. However, there are the inevitable galactic mutations trying to hinder your journey.

*Planet X* is the second program where you must guide your large ship supply vessel to stranded scientists on the planet Yagoo. They are situated deep underground so you need to negotiate the treacherous course through caverns strewn with strange obstacles.

Mastertronic is also launching a new label named *Building* (list of books).

The company claims to have commissioned some startling original products for the new label which will have a distinct identity to complement the existing Mastertronic £1.99 and £2.99 ranges. The first title, already in the shops, is *Prod*, at £1.99.

Recently formed Budget House, Code Masters, has just announced a competition for buyers of Code Masters games. Anyone buying a Code Masters game will get an entry form to the BMX competition. All you have to do is input the token rider which has been deleted from a screen shot of the Code Masters game *BMX Simulator*. Entries are only limited to the number of Code Masters games you buy. Hurry, because the competition closes on 31 March 1987 and the prize is a 20" Sony Trinitron colour TV.

Other new pocket money priced games are *Wildcat Junction* on the Firebird Silver £1.99 label and *Cyber J* on the Supersofts label from CDS at £2.99. Both are for the C64.

### Findings

**Midas Marketing:** 21 West Aisle, Darnley, Kent DA1 2EL. Tel: 0322 82511.

**Mastertronic:** 8-10 Park Street, London EC2A 4WE. Tel: 01 377 6885.

**Code Masters:** J. Stevenson Business Centre, Beaumont Close, Rushway, Oxon OX10 7BT.

**Firebird:** First Floor, 74 New Oxford Street, London, WC2A 1PE. Tel: 01 240 8032.

**Supersofts:** CDS, Unit A11, Armstrong Mill, Southwood, Somers Chase, Southwood, Farnborough, Hants, GU14 0NP. Tel: 0752 322208.

The system works in the following way: a small slot is cut in the case to allow the datafinder adjuster to move forward and backwards as play and stop are required. A knob is attached to a threaded shaft which replaces the animal's screw allowing an adjustment of 180 degrees. Sound is also fitted for the Commodore 64 allowing the user to adjust to the clearest data signal. For the technically minded there is a DDT kit available. If you're interested, then contact the address in Touchline for more information.

### Touchline

**Touchline:** 61 Bridge Street, Exmouth, Devon EX21 4SP. Tel: 0398 47680.

**Lead-In:** 15 Sycamore Road, Shirley, Solihull, W Midlands B36 8ET. Tel: 021 743 4978.

## Notes on Utilities

Supersoft, the company which has recently supported the PET series from the beginning, has now fulfilled a recent promise to continue to provide software for these machines.

*Fast Copy* is a disk copying facility for the 8032 and 8296 drives which can drastically reduce the time it takes to make vital check-up copies of data disks. It saves time by omitting the formatting process on an already formatted disk and by copying only those blocks that have been used. Available at the low cost of £15 (ex VAT).

*Blitz* is a Basic compiler for the 8032, 4032, 8096 and 8296 computers. *Blitz* has been available in Europe for some time and has now been licensed to Supersoft in the UK. Compiled programs run five, 10 or even 20 times faster with *Blitz* and since they are impossible to alter by anyone who hasn't got access to the uncompiled original, they are also more secure.

*Blitz* costs £59 (ex VAT) and comes with a comprehensive manual. Additional versions on the same disk are only £30 extra, so for example the 8032 and 8096/8296 version would be £129 altogether.

*Fast Copy* and *Blitz* are available from Supersoft or on order from your local computer store.

Starting with utilities but moving to

## Drives and Data Recorders

The *Enhancer 8060*, the only available alternative to Commodore's own series of disk drives, although stable and reasonably priced, has always suffered from compatibility problems. Now Evisham Marine claims to have solved this.

Evisham claims that on the enhanced version of the *Enhancer*, all disk surfaces and virtually all disk protection schemes can be handled without a problem.

Priced at £148.95 (fully inclusive) and an option to purchase with *Finance* from £4.95 and 10 disks for £179.95, Evisham reports high demand from all quarters.

At the moment supply is restricted



Lead-In

to mail order, unless you call in at one of Evisham's two branches. However, Evisham hopes to expand availability to other retailers in the near future.

For those still struggling with data recorders, you may be interested in the *Lead-In* system.



the C64. Systems software has recently published *Oxford Asic*. This is a complete C64 Basic programming environment and gives the user a full library of powerful editors including: *Oxford Analyzer*, a report optimisation utility; the *Compressor* which eliminates time consuming spaces and REM; the *Tweaker* which introduces new commands; *On-Comp* a fast fully compatible Basic compiler to give you the speed and professionalism of machine code without an assembler. The all-inclusive price is £34.95.

#### Turnkey

**Supernote: Windows Mouse, Canning Road, Wootton Bassett, Wiltshire, Wilt BA1 7SL. Tel: 01 907 1165.**

**Systems Software: 108, Worcester Place, Oxford, OX1 2AR. Tel: 0865 36765.**

### Potential Millionaires Wanted

American software company MicroProse, which has recently established a UK base, is looking for

Commodore software writers with the potential to become millionaires overnight.

The man behind the hunt is Simon Bernard, MicroProse software development manager. He said: "We believe that the UK has the best Commodore software writers. Anybody job is to find them and offer them, not only money, but international recognition".

MicroProse in the US spends in excess of \$1 million in developing its software programs. However, Simon is not just looking for simulation specialists, he also wants programmers of top-quality arcade games.

Simon revealed his reasons for believing that successful applicants may soon gain millionaire status: "MicroProse titles remain at the top of the US charts, literally for years. And that translates into a lot of royalties, besides substantial advances. So I don't think it would be unfair to claim that if we can find someone who can write simulation like *SimCity* Service, they could be a millionaire almost

overnight".

MicroProse has an extensive list of simulation programs, the latest of these, due for imminent release, is *Gladius* for the C64/128, £14.95 cassette, £19.95 disk.

*Gladius* is an accurate simulation of the Hughes AH-64A Apache combat helicopter - one of the most lethal weapons in the modern military arsenal.

*Gladius* is the result of extensive research and the collaboration of two men years of programming and games design. It was held back from release until military helicopter pilots had actually test flown *Gladius* themselves. Now the US army uses it to train test pilots, attaching sensors to their bodies to measure reactions. The

#### Turnkey

**MicroProse: 3 Market Place, Tetbury, Gloucestershire GL8 8AB. Tel: 0608 34335.**

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# I.Q.

*More and more people are turning to games which need grey matter rather than thumb power on a joystick. Here's another exciting selection to tax your mind.*

Adventures can sometimes seem rather daunting to the uninitiated. Apart from the necessity of learning adventurespeak and the all important mapping technique, there's the bigger problem of mind bending puzzles to solve. All this could easily turn away the average player, however we've decided to have a look at a couple of programs from Amuletsoft which may help to break you in gently so that you can cultivate the adventure bug.



## THE PHILOSOPHER'S STONE

Commodore machines aren't the exclusive preserve of Britishers and our US Buddies. Europe is a land of Commodore enthusiasts and Germany is perhaps the heart of this trend. It is fitting then that this game from Amuletsoft originally started life there. Actually called *Eggs' Philosophem*, but translated for non-classicists, this is an ideal starting point for new adventures and an interesting diversion for more experienced addicts, unfortunately only available for C64 and 128 disk users.

The basic storyline concerns a medieval king, High Gusselmar, whose steppson has been systematically poisoning him. The only hope left to the old boy is the Philosopher's Stone which has the fantastic powers of turning base metals into gold and curing all ills to boot.

Your character is that of an ageing alchemist. You have found clues to the whereabouts of the fabulous stone in a

book in your loft (where else?). So you set out to get hold of it. Make sure that you explore your home town thoroughly first. Leaving town may be a problem as the prince has discovered the nature of your quest and the guards are ordered to detain you, however, with the right object you can negotiate them into letting you pass.

One distinct advantage for new initiates are the HELP messages placed in strategic parts of the game. Read them well as these cryptic clues may prove invaluable.

Most items which are available are included in the location description, however, if you go to the market there's more choice but you have to think hard about what you may need later on. Remember to SAVE your game position in the early stages so that you can go back for anything you may have omitted to collect.

The graphics are clear, colourful and reasonably detailed. Disk access is at the usual slow speed.

If you are surviving between locations the format N,N,W,N,E,GET STUCK can speed up playtime. The interpreter understands basic verb/noun formations but an occasion a little more detail may be needed. One retrograde aspect is the necessity to enter all words in full with very few single letter entries understood. Two that you can use are I for Inventory and L for look to report a location description.

There is no RAM SAVE facility but there are seven named positions saved to disk. You will need these as in several places death will follow the wrong move, for instance if you lose a game of Hangman with a troll!

Although a most enjoyable game with lots to find and plenty of puzzles to solve. There are said to be seven different ways to complete the game so perhaps experienced players will appreciate that challenge. Definitely fun for all levels of player.

P.P.

## NECRIS DOME

Due to limitations of room and resources, the Earth's dead are no longer buried or cremated as used to happen, but are transported into orbit. There, a huge space cemetery called the Necris Dome circles around. Run by a group of maniacs, they in turn are controlled by an Arch-maniacoid who is rumored to be trying to create something of a powerhouse for himself.

As weapons have been banned on Earth for a few



centuries, it is really bad news when it is discovered that the Arch-mandrill has filled the Necris Dome with various potential forces and got straggled into the dome in the next batch of coffins. Your mission is to test out and destroy the Arch-mandrill at all costs.

Necris Dome is a somewhat simplistic adventure which starts with you in your coffin. The first illogicality strikes you straight away. Although you can see nothing in the coffin either now or when you open it, if you return to the coffin and close the lid, a pair of rubber gloves has mysteriously materialised. Nothing is guaranteed to put off an adventure player (or at least this reviewer) than such nonsense.



The atmosphere created by the game is minimal. Location descriptions are terse - 'you are in the reception level chamber (three as opposed to chamber two or four). The graphic likewise has a feeling of similarity to them. Even at a budget price, I cannot recommend Necris Dome G.R.H.

As promised in our IQ, pages, we're not just trying to publish a run of the mill adventure column, so for those of you who want something a bit different, read on to check out some other original games.

## TASS TIMES

If your idea of style is a infra-red diameter switch then you'll wish this ludicrous graphic adventure from Activision.

The game is set in the ultra tan (trendy) world of Tontown that exists in another dimension. Your favourite old fogey, Grampa has built an inter-dimensional machine and has got himself lost in Tontown and it's up to you to find him. Helped by Grampa's dog Spot who is really Elvis the Legend in Tontown you must search this strange land trying not to look too much like a total tourist.

There's nothing weird about the excellent adventure system used to play this game. The screen display is split into areas including a graphic display of your current location, a text display (for text only freaks) and alongside them a series of large icons through which you can quickly generate the commands look, enter, hit, buy, get, drop, talk to, tell me

about as well as north, south, east, west, up and down. You can also enter standard text commands use the predefined function keys to repeat commands and shortcuts and load game positions. You can even examine and get objects illustrated in the pictures by simply pointing a cursor at them.

The villain of Tontown is an ugly green brute called Franklin Sael who would love to get his claws on you in between his attempts to buy up the town. His antics do do and other essential clues are packed into the latest edition of the Tontown Times that also includes adverts that will help you become tan and the usual collection of curious small ads.

Tass Times is undoubtedly a unique adventure featuring the most peculiar settings, characters and descriptions but it is also very good and will be Activision's best non Infocom adventure. Remember Tontown welcomes visitors but not total tourists.

T.B.L.



## THE STANDING STONES

This is the second Ariolsoft title which holds a challenge for the beginner without being too complicated. Set in the ground beneath an ancient stone circle, the idea is to locate the long, lost Holy Grail.

When you begin play you must create a knight. Go carefully here, as it is important. A list of attributes appears with random ratings of up to 18. If you don't like the numbers assigned, you can try again. The instructions suggest that you only accept a character with at least three attributes in double figures. In which case, why do they give so many with less than 10? The attributes are: vitality, intellect, holiness, agility, and initial hit. These can be roughly translated as strength, magical attack, peaceful spells (such as 'heal' and 'teleport'), agility is self-explanatory and initial hit indicates your ability to withstand attack.

Once you've settled your character, it's time to enter the 3D maze, where you must explore, fight monsters and collect treasure.

The maze must be mapped for you to stand any chance of success. On the first level a series of arrows points the way to the exit. It is best to use this over and over again so that you build up your experience. Leave it at your peril.



Apart from the monsters there are many useful items, including magical books, chests, potions, rings, weapons and armour. Unfortunately many of these articles are booby-trapped so it's not all plain sailing.

When you encounter a monster you have several courses of action: fight, flee, bribe or run away. Fighting is usually the best option, however, arrows and poisons will sometimes return a grunting and gives you a gift as well.

Throughout your quest you have a companion named Lancelot. Most of the time he is swooning or sharpening his sword but occasionally he bursts into action and dispatches your present foe.

The deeper you go the harder the game becomes. Further down there are caves which will restore drained strength but they're not always in the same place.

The graphics consist of simple line drawings for the maze and fairly basic shapes for the enemies. You may leave the dragons at any time to save your character.

Not a bad game if you choose your character carefully before testing the depths. Even then you should not expect to stay alive long unless you map your route and this can be difficult due to secret doors and one way passages. *The Standing Swords* calls for a lot of patience, a will to live and a lot of luck.

P.F.



## SHANGHAI

A variation of the card game pairs doesn't sound like the usual fodder for a computer game but it's surprisingly addictive.

This variation uses the 144 tiles found in a *Maht Jongg* set (the ancient Chinese game) arranged in a set pattern that is supposed to represent a dragon. The pattern rises in the middle to a height of five piers (the head) and down to rows of single tiles.

To complete pairs that are then removed from the game the player can only match tiles that aren't surrounded by others which usually means from the head and tail. By this method you must try and remove all of the tiles or at least as many as possible either on your own, in solitaire play or against other humans in a tournament game against the clock.

Matching pairs can be a strain on the eyes as you stare into the screen at an average of 80 tiles that are in view for most of the game. The others are hidden from view in the piles in the centre of the pattern which you must gradually whittle down.

*Maht Jongg* sets contain 144 tiles split into three major suits and crabs, bats and spots (also known as characters, bamboos and circles) three dragons, four winds and an odd collection of flowers and seasons. As there are four of each piece you would think that matching pairs would be easy but you'd be surprised at the number of times you'll have a choice between three pieces and have to work out which one to leave.

Options at the bottom of the screen allow you to undo moves you want to play again and even peek at hidden tiles once you've given up.

At last an addictive strategy game.

T.H.

## DODGY GEEZERS

The big day has arrived. Your stay, courtesy of Her Majesty is about to end. It was only supposed to be for two years, but you got time added on for bad behaviour. You have been looking forward to this day for some three years now, not least because you have a small amount of unfinished business to attend to. You were stashed up something rotten over that Long Dragon spaghetti eater and a spot of revenge would not go amiss.

*Dodgy Geezers* is an adventure in two parts. In part one, you must find a crime to commit and assemble a team to help you do it. Part two involves pulling off the actual crime. The game is set in the East End of London, presumably because everybody knows that that is where all the real criminals hang-out. There is the usual collection of mistletoes you make your way round dark alleys, seamy pubs, a dockland area and the dog track. Crimes are being committed all round you, judging from the number of wanted posters about, but can you actually find the men required for your team? And who is the shadowy figure with the white Guard shoes who turns up everywhere? And why are there several crates hidden in the warehouse full of two inch nails when they are clearly marked Bando di Palamotto? All you have to go on is a telephone number from a colleague who was released on the same day as you. All you want now is a working phone.

*Dodgy Geezers* is a reasonable enough game without being outstanding. The parser is fairly crude, being for the most part verb/noun input. There are a few spot graphics, usually the wanted posters which brighten the place up but the pungent atmosphere and jokes don't quite work.

G.H.H.

## Touchdown

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*Novus Game Code Masters, 1 Beaufort Business Centre, Beaufort Chase, Banbury, Oxon OX16 9PT*  
*Sam Evans, Shanghai: Activision, 23 Pond Street, London WC2E 9PH*  
*Dodgy Geezers: Melbourne House, 60 High Street, Malmesbury Wilt, Kingston-upon-Thames, Surrey KT 140B*

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# Football Fortunes

*Polish up your football boots, get your mum to wash your strip and sit down to a game of soccer with Brian Clough.*

*By Tony Hetherington*

**B**rian Clough has always been known as an unusual football manager. Now the game that carries his name is a computer game with a big difference because it's also a board game!

Inside a packed video size cassette box is the game tape on disk, a folded game board, five coloured counters, 112 player cards, immunity cards and a heap of game money and, of course, an extensive instruction booklet. As the game loads the players just have time to sit out the board, ready and pieces and sign up as a top manager in a super league of 80 teams. Between two and five teams can be managed by humans the rest are controlled by computer and one of four skill levels. There's no great mystery here, the higher the skill level the stronger the computer teams that you'll face.

In fact the whole game is remarkably simple and after only a few minutes you'll be whizzing and dealing with the best of them. Indeed the hardest part of the entire game is persuading the game board to stay flat after being folded up inside the box.

Once the game has loaded you have to choose your team from the list available or you can overweigh one if your favourite's not included in the initial line up. After a brief



pause, the computer displays the line up for each team in two including two reserves. This line up consists of a series of numbers, between one and five that represent the skill levels of your goalkeeper, defenders, midfielders and attackers that form your initial squad of players. You then take the corresponding cards from the pack of playing cards to start the game. These cards also feature names for every player that are sure to cause rows particularly if you're favourite's only a level one and not an international standard level five. The names aren't important to the game but vital to football fanatics as a few blank cards are included to correct these "mistakes".

The game plays as alternate rounds of moving the pieces around the board and football features on the computer although the computer is active throughout.

By throwing the computer dice players move their counters around and land on squares that contain the problems and crises that make up a manager's job. These range from the Manager's Luck and Salvation Problem Cards that are displayed randomly on the computer screen to the dreaded Wages that are paid out and depend on the size and skill levels of your squad.

The Manager's Luck cards are a bit of a lottery, and can cost you £25,000 to install extra staff or gain you £100,000 by













# Shepherd's View

*Nigel Shepherd, boss of Commodore US, explained his recipe for Commodore's future success to our globe*

*travelling reporter,*

*By Peter Chandler*

**I**n this business, shows are always worth a look since they provide a general gathering of the big wigs of our industry. The CES Show in Las Vegas in January was no exception, and that's where I managed to track down Nigel Shepherd, General Manager of Commodore North America, discussed on the splendour of Commodore's stand.

## The Venue

The CES Exhibition is held twice a year in the USA. The summer show is staged in Chicago and the winter extravaganza takes place in Las Vegas. It was to the latter venue that I headed my way this year.

The Las Vegas show is the largest of its kind in the world and this year's event was no exception with a record attendance of over 100,000 visitors. The show is open only to trade visitors, made up largely of representatives from retailers, manufacturers and the media, pouring in from the USA and all over the world. Exhibitors consisted mainly of audio, video, satellite, photographic and most importantly from my point of view, computer companies.

There were four venues: the Las Vegas Hilton, the Convention Centre, the Sahara Hotel and the Riviera Road. The home computer companies were all based in the West Hall, a huge building which is just one of many which form the Convention Centre.

Commodore was there in force and exhibited its products from a massive and very impressive stand. It was a fascinating sight to see Commodore taking such an aggressive approach at

the largest show of its kind in the world. Commodore launched three C64/128 products at the show: the



*Nigel Shepherd*

1880 3½" disk drive, 1764 RAM Expansion card and the U31 mouse. A number of software companies were exhibiting from the stand including Byte, Byte, Quantum and Amulet Research.

## The Man Himself

Nigel Shepherd, a man of presence, very charming and charismatic, is the General Manager of Commodore US and North America. He reports directly to Tom Rattigan, President and Chief Executive Officer of Commodore USA. The other individual in the sales and marketing hierarchy who also reports direct to the President is Harald Speyer, based in Frankfurt, Germany and responsible for European operations.

Nigel Shepherd is Scots by birth and Australian by connection and has been involved with Commodore since 1977. Initially as an Australian Commodore distributor, Commodore later set up an Australian subsidiary and in 1979 Nigel Shepherd became the General Manager for the Asia Pacific Region (all countries from Australia to Hong Kong). In January 1988, he moved to the US to take over North American responsibilities.

## Tripartite Aims

Nigel Shepherd sees Commodore as active in three sections of the computer industry.

Firstly, he sums up the C64/128 as the "classic definition of the home computer". His authoritative view is that 90% of all C64/128 purchasers are first time buyers, also many 128 buyers are people upgrading from a C64.

He also sees Commodore playing an important role in the large educational market in the US particularly in the primary school sector known in the States as K1 to K12. To back this up Nigel also pointed out that in the USA, Germany and Australian markets Commodore are leaders with the C64/128 in home computers. He sees the C64/128 as a common product line which will be around in 1990 and Commodore will continue to support the machines with peripherals software etc.

The much appraised Amiga machine, only recently launched, is seen by Nigel as the future of Commodore both in the home and business markets.



Being Frank, Nigel commented that "probably the single largest criticism aimed at the Amiga is that the consumer is unsure whether or not the machine is for the home or is a desk top computer - a computer too highly priced to be accepted as a home computer and the lack of productivity

software and there is still a great demand for productivity software. The buyer who has grown up with a C64 or even a Spectrum, and is looking for a second purchase will appreciate better sound, graphics and top class games - Amiga technology lends itself to this market.



Com's 2000 clone

software makes it difficult to accept it as a business machine."

Commodore's answer to this criticism is to launch three different versions of the Amiga and attack both home and business markets in terms of price and quality.

Nigel explained that the first version, the Amiga 1000, has fantastic user loyalty and it will be followed in the next few months by two new Amigas the 500 and the 2000 to expand the product line.

Nigel explained the thinking behind this strategy. He envisages that the C64/128 will be purchased as a family machine by first time buyers with a main use for children aged five to 12 years old. The machine is not too expensive but Commodore cannot be sure that the family will continue to use it. The answer to upgrading combined with continued brand loyalty is the Amiga 500 - the low cost version, described by the enthusiastic General Manager as "the ultimate home computer". On top of this the high demand for computer learning will

## 2000 Amiga

The 2000 Amiga will be a desk top or business computer and will also be the home overlay machine. Nigel Shephard believes that "the home is a location". Although traditionally used for learning and entertainment, many small businesses are now doing domestic work as cottage industries. The 2000 will lend itself both to the home/office and true business application.

As we go to press, both the 500 and the 2000 are scheduled for launch in the Hannover Fair in Germany at the end of March.

Nigel also sees the Amiga gaining acceptance in tertiary education. He claims that it is ideal for universities as its price combined with its sound and graphics capabilities are not found elsewhere. He quickly pointed out that the Apple Mac has neither the sound or colour of the Amiga and also stressed that neither the Mac or the Atari have MS DOS Capability.

## Purely for Business

Commodore's third section of interest in the computer market at the moment is inevitably the business end due to the Amiga's PC AT, XT and MS DOS compatibility. Commodore has also launched the PC16 and 20. The PC10 was only recently launched in the US so it's still early days for these machines.

## Working Philosophical

Nigel Shephard explained the Commodore philosophy in the following terms. "Commodore will continue to design and manufacture machines that are competitive and will enable both Commodore and resellers to make money. We will continue to be in the MS DOS market place. There will always be a home market and Commodore's original forte is serving that market. Commodore is moving up market to desk top publishing and corporate type machines. We are committed to today's and to future market places."

He added: "The difference between today and two years ago is that now a machine can be suitable for all of the markets - home, personal and business - all in one box whereas before there were three distinct machines. Commodore has one major advantage - the Amiga chip-set."

Asked specifically about Commodore's UK efforts, Nigel replied: "Commodore North America has been through tough times in the last 18 months and like Commodore UK, had to rationalise the business and start all over again." However, Nigel believes that the corner has now been turned. He sees Commodore UK consolidating and building in this country. Absence of major promotion was evident in the past but the company has fought for survival and we will now see a much more aggressive approach. Nigel Shephard is confident that Commodore will return to being a major player in the UK marketplace.

For Commodore certainly hopes so and we'd like to thank Nigel Shephard for taking time to express his view of Commodore North America.



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# Sport on Channel 64

*Futuristic sports games are all the rage at the moment. Try your hand at these out-of-this-world titles.*

*By Tony Hetherington*

**S**port in the future (according to the software houses) is to be fast, furious and will usually involve a steel ball. These obviously won't be any grass left in the world as not a blade is in sight as an average of 1.8 humans battle on race-tracks, robots and spacecraft in purpose built tracks, planets and tracks.

Futuristic sports games are inevitably influenced by science fiction films, notably *Antihell* and *Death Race 2000*, and are often developed from existing sports to bolster flagging release ratings.



## Racing Destruction

Hewson's *Alleykat* leads off the future races as you compete in a bizarre set of challenges known as the Alleykat races. Written by Unidam author, Andrew Braybrook, the racer must compete in contests such as the Moon Opus, Astro Classic, Galactic Opus and Mad/May Search. He pilots a custom built convertible racer that can swap from high speed, slinking single racer mode to a slower twin laser craft for maximum destructive power. The races are run over a variety of planet surfaces that range from the fragile



dust-track and the leafy Asteroid to the indestructible hardwall which will destroy a racer on impact.

The object of the game is to amass points by winning races and prize money so that you can enter more races to gain more points. Points are won by completing the race (an achievement in itself), by shooting the laser firing robot spacecraft that are thrown in to iron things up and by





scoring bonus points that depend on the race type. In time trials bonus points are linked to your time, in endurance races it's surviving that matters and in destruction races you must destroy the landscape.

### On the Ball

Gamma's *Triathlon* is, by comparison, a far simpler game in which you must bounce a ball down a track that barrels out of the screen at you at breakneck speed. Again staying on the track is a major task in itself without your opponent's efforts to push you off into oblivion. Bouncing from square to square you must plan your route along the narrowing platform avoiding the traps that slow you down, reverse your controls or send you plummeting out of the contest. Then you're ready to gently push your opponent over the edge to gain those crucial seconds to win the race.

*Ballblazer* (Activision) sets two *Ballblazers* in competition with each other as they race around a levelled pitch chasing a steel ball. Their aim is to fire the ball into one of two moving goals.

In a fast game the balls that are controlled by either human or dumb pilots can catch or fire the ball using their protective level fields. The outcome is decided on points with a goal being worth more if it is scored from a distance. A fast and furious game that's incredibly addictive to play.

The same could also be said of *Odin's Rhapsody* which features the battle for the Super Cup between two three man teams, the Hawks and the Vipers. Before the match you can choose your players from the 18 men agreed to be your proposed strike one and two and fourthousand grounders. After a quick appearance by the choralemen the players take their positions either side of the central pole on which the goal globe travels on its relentless path up and down making goals even harder to get.



Thanks to a floor field network the players are trapped in zones in between which the ball bounces and rebounds until captured by a player. However he has only two seconds (otherwise he incurs a penalty) to pass the ball or shoot at goal.

After 18 grueling minutes of play the result is reported in the popular newspaper the *Edin*.

### Bouncing Out

*Rain 10* is an entirely spin off from CHL's *Ten Cuts* and is

found in the Gal-corps leisure complex. Described as a mixture of *Ballblazer* and *Pong*, the game features a split screen battle two giant bats to knock a ball behind their opponent to score points.

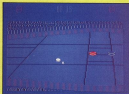
Knocking a ball into a goal is the aim of *Argus Press Software's Dots* and is a futuristic development of classic halfpenny football. The two contestants must fire their own ball to intercept and knock the ball into the goal to score in front of a capacity crowd.

Finally, the *Warrior* *Bowmen* from *Beyond* takes description as two armour clad knights, called Eric and Ashley fire a steel ball at each other and into holes in the wall to score match winning points.

### Touchline

*Review: 164 Wilson Trading Estate, Milton, Abingdon, Oxon OX14 4NY. Tel: 0215 852919.*

*Activision: 22 Pond Lane, Hempstead, London NWJ 2PB. Tel: 01 437 1191.*



*Gamma: Alpha House, 10 Carter Street, Sheffield S1 4PS. Tel: 0742 715421.*

*Odin and Beyond: First Floor, 14 New Oxford Street, London WC1A 4PS. Tel: 01 240 8838.*

*CHL: 9 Kings Road, Carpenter's Road, London E15 2BD. Tel: 01 235 2938.*

*Argus Press Software: Victory House, Leicester Place, London WC2H 7BL. Tel: 01 430 0666.*





# Basic Memory

*Programming in Basic can be a headache especially if you start running out of space. These routines should ease the situation.*

*By Allen Webb*

**T**he 64 has a full complement of 64K of RAM, but the designers, in their infinite wisdom, made only about 8K available to Basic. For those able to use machine code, the RAM behind the ROMs is quite useful but to most others, it's forbidden fruit. There is nice lump of 4K between the ROMs, however, which can be used. Basic keeps track of storage of variables in a collection of zero-page pointers. These pointers, along with their starting values, are listed in Table 1.

## Pointer Variations

The values of these pointers are changed as program lines or variables are added or removed. By setting these pointers to the RAM between the ROMs, we can have a second variable area. Listing 1 gives a short routine which will do this task for you. The routine lives in the cassette buffer so that it doesn't pinch any memory. The routine has three entry points:

**SYS 836:** This sets up the table which saves the pointer values to some default values pointing to the spare RAM. This table is switched in when you want to use the extra RAM and is updated when you return to the normal RAM. This command effectively performs CLR on the extra RAM. Since using this command when the extra RAM is active means things up, it denotes which RAM is in use and

acts accordingly. Calling it when normal RAM is active gives the required result. Using it with the extra RAM active simply results in a flashing border as a warning and nothing else. As far as I can see, CLR will set

correctly on the extra variables when they are active.

**SYS 835:** This switches in the extra RAM. The border turns red to warn you about it.

**SYS 836:** This switches back to normal RAM. The border is set the light blue to show it.

Attempting to activate a variable set when that set is current may corrupt the pointer tables. Consequently, the routines won't let you take such action.

Once you have the extra RAM switched in, the operating system updates the pointers as required. So that the extra variables are protected, the pointer values are remembered each time you switch to normal variables.

Listing 2 gives a simple demo to show how the routine works. Line 10 performs CLR on the extra RAM and switches it in. Since FRE uses the variable pointers, you will see that it works correctly on both sets of RAM. The routine shows you that two variables sets of variables with the same names can be used.

One word of warning. You must not perform actions which change the pointers or use software which depend on them when the extra RAM is in use — always switch the normal RAM back in first. Such operations include adding or deleting program lines and using assemblers which use the variable pointers to assist storage.

## Alternative Process

An alternative method of adding to your available memory is the use of random access or disk to provide virtual memory. Some serious

### PROGRAM: LISTING 1

```
10 POKE POKE-OTCH+CH-0,POKE-OTC
15 HEAD=CH-CC+L:POKE30+L+1
2-0,0:GOTO
20 POKE HEAD:IF#0:GOTOPOKE100+
2000:IF L#0:POKE-CL+1:GOTO
300
25 POKE HEAD+200
30 POKE HEAD+21+3+16,148,3,74
184,3,173,186,1,160,18,147,
0,140
35 POKE HEAD+176,10,208,141,208,
2,248,8,148,31,208,200,208,2
00,171,148,140
40 POKE HEAD+143,171,208,2,248,3
8,148,8,140,0,147,171,2,171
148,3,187
45 POKE HEAD+140,176,3,173,186,2
180,171,17,186,126,76,3,140
3,181,200
50 POKE HEAD+140,8,208,8,8,4,2
08,3,8,3,8,3,8,140,184
55 POKE HEAD+8,3,148,171,208,2
148,3,74,18,3,148,0,147,47,
137
60 POKE HEAD+176,188,2,188,148
2,173,17,0,208,147,17,248,2
18,208,147
65 POKE HEAD+143,141,208,2,141,2
141,31,208,40,173,186,1,188
3,74,140
70 POKE HEAD+3,248,8,148,17,0
173,148,3,141,186,1,171,47,
0,140
75 POKE HEAD+180,171,17,208,218,
248,8,141,208,2,148,14,147,3
1,208,80,1812
```

Table 1

Pointer location	Function	Starting value
45,46	Start of variables	2850
47,48	Start of arrays	3050
49,50	End of arrays	2850
51,52	Bottom of storage	40960
53,54	Top of variables	40960



programs use this approach to provide HELP information without reducing the memory available to the main program. The Listing 3 provides a general routine which will store and recall blocks of up to 255 bytes on disk. To those of you who aren't in the know, the disk is split into 35 tracks, each comprising of a number of sectors. The number of sectors varies from 17 to 31 depending on the position of the track. Each sector holds on block or 255 bytes.

The program uses a menu system to provide four options. The first option reserves the specified sectors and fills each with a zero byte (00). This is because a zero byte is used as a sentinel to indicate the end of a string. The reservation (or allocation)

operation is satisfied if you use the valid disk information, or format!

Option 2 saves a string at the required location. Since you may want to input string of up to 255 bytes, a special input routine (lines 790 to 808) is used. All you do is type in the string using cursor keys and DEL to add it. The string must end with an asterisk. When the string is complete, press back arrow to process it. The sectors on the disk are numbered sequentially so that track one holds sectors zero to 20, track two holds sectors 21 to 40 etc. Since tracks are of variable length, the routine from lines 1420 to 1470 is needed to calculate the relevant track/sector from the number of the data block.

Option 3 loads and prints a

specified data block. If you want to extract data in your own programs, you should reproduce lines 580 to 680, lines 1420 to 1470. If you're a careful programmer, you should also use the error checking routine (lines 1870 to 1900).

Option 4 prints a map of the disk contents. Allocated but unused sectors are shown as "00". Those containing data blocks are shown as "XX". The final option simply allows you to format a disk.

Data saved using this program does not appear on the directory since it is written direct to the disk. If, in fact, you use the track which holds the start of the directory (track 10), and try to load the directory, you will get an interesting result!

#### PROGRAM: LISTING 2

```

30 10 STRING
31 20 PRINT "CLR: CLEAR AND ACTI
SAVE: PROTECTS DATA FILES"
32 30 STRING: CLR: PRINT "NO S
SYSTEM: " AFTER FREE"
33 40 PRINT "DOES: NO SET UP T
O VARIABLES"
34 50 AS "FORMAT STRING" 2-0
(2-28)
35 60 PRINT "DOES: 01-01" 3-0
36 70 PRINT "DOES: 01-01" 3-0
37 80 PRINT "DOES: 01-01" 3-0
38 90 PRINT "DOES: 01-01" 3-0
39 100 PRINT "DOES: 01-01" 3-0
40 110 AS "NORMAL STRING" 2-0 0-0
1000
41 120 PRINT "DOES: 01-01" 3-0
42 130 PRINT "DOES: 01-01" 3-0
43 140 PRINT "DOES: 01-01" 3-0
44 150 PRINT "DOES: 01-01" 3-0
45 160 PRINT "DOES: 01-01" 3-0
46 170 PRINT "DOES: 01-01" 3-0
47 180 PRINT "DOES: 01-01" 3-0
48 190 PRINT "DOES: 01-01" 3-0
49 200 PRINT "DOES: 01-01" 3-0
50 210 PRINT "DOES: 01-01" 3-0
51 220 PRINT "DOES: 01-01" 3-0
52 230 PRINT "DOES: 01-01" 3-0
53 240 PRINT "DOES: 01-01" 3-0
54 250 PRINT "DOES: 01-01" 3-0
55 260 PRINT "DOES: 01-01" 3-0
56 270 PRINT "DOES: 01-01" 3-0
57 280 PRINT "DOES: 01-01" 3-0
58 290 PRINT "DOES: 01-01" 3-0
59 300 PRINT "DOES: 01-01" 3-0
60 310 PRINT "DOES: 01-01" 3-0
61 320 PRINT "DOES: 01-01" 3-0
62 330 PRINT "DOES: 01-01" 3-0
63 340 PRINT "DOES: 01-01" 3-0
64 350 PRINT "DOES: 01-01" 3-0
65 360 PRINT "DOES: 01-01" 3-0
66 370 PRINT "DOES: 01-01" 3-0
67 380 PRINT "DOES: 01-01" 3-0
68 390 PRINT "DOES: 01-01" 3-0
69 400 PRINT "DOES: 01-01" 3-0
70 410 PRINT "DOES: 01-01" 3-0
71 420 PRINT "DOES: 01-01" 3-0
72 430 PRINT "DOES: 01-01" 3-0
73 440 PRINT "DOES: 01-01" 3-0
74 450 PRINT "DOES: 01-01" 3-0
75 460 PRINT "DOES: 01-01" 3-0
76 470 PRINT "DOES: 01-01" 3-0
77 480 PRINT "DOES: 01-01" 3-0
78 490 PRINT "DOES: 01-01" 3-0
79 500 PRINT "DOES: 01-01" 3-0
80 510 PRINT "DOES: 01-01" 3-0
81 520 PRINT "DOES: 01-01" 3-0
82 530 PRINT "DOES: 01-01" 3-0
83 540 PRINT "DOES: 01-01" 3-0
84 550 PRINT "DOES: 01-01" 3-0
85 560 PRINT "DOES: 01-01" 3-0
86 570 PRINT "DOES: 01-01" 3-0
87 580 PRINT "DOES: 01-01" 3-0
88 590 PRINT "DOES: 01-01" 3-0
89 600 PRINT "DOES: 01-01" 3-0
90 610 PRINT "DOES: 01-01" 3-0
91 620 PRINT "DOES: 01-01" 3-0
92 630 PRINT "DOES: 01-01" 3-0
93 640 PRINT "DOES: 01-01" 3-0
94 650 PRINT "DOES: 01-01" 3-0
95 660 PRINT "DOES: 01-01" 3-0
96 670 PRINT "DOES: 01-01" 3-0
97 680 PRINT "DOES: 01-01" 3-0
98 690 PRINT "DOES: 01-01" 3-0
99 700 PRINT "DOES: 01-01" 3-0
100 710 PRINT "DOES: 01-01" 3-0
101 720 PRINT "DOES: 01-01" 3-0
102 730 PRINT "DOES: 01-01" 3-0
103 740 PRINT "DOES: 01-01" 3-0
104 750 PRINT "DOES: 01-01" 3-0
105 760 PRINT "DOES: 01-01" 3-0
106 770 PRINT "DOES: 01-01" 3-0
107 780 PRINT "DOES: 01-01" 3-0
108 790 PRINT "DOES: 01-01" 3-0
109 800 PRINT "DOES: 01-01" 3-0
110 810 PRINT "DOES: 01-01" 3-0
111 820 PRINT "DOES: 01-01" 3-0
112 830 PRINT "DOES: 01-01" 3-0
113 840 PRINT "DOES: 01-01" 3-0
114 850 PRINT "DOES: 01-01" 3-0
115 860 PRINT "DOES: 01-01" 3-0
116 870 PRINT "DOES: 01-01" 3-0
117 880 PRINT "DOES: 01-01" 3-0
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126 970 PRINT "DOES: 01-01" 3-0
127 980 PRINT "DOES: 01-01" 3-0
128 990 PRINT "DOES: 01-01" 3-0
129 1000 PRINT "DOES: 01-01" 3-0
130 1010 PRINT "DOES: 01-01" 3-0
131 1020 PRINT "DOES: 01-01" 3-0
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137 1080 PRINT "DOES: 01-01" 3-0
138 1090 PRINT "DOES: 01-01" 3-0
139 1100 PRINT "DOES: 01-01" 3-0
140 1110 PRINT "DOES: 01-01" 3-0
141 1120 PRINT "DOES: 01-01" 3-0
142 1130 PRINT "DOES: 01-01" 3-0
143 1140 PRINT "DOES: 01-01" 3-0
144 1150 PRINT "DOES: 01-01" 3-0
145 1160 PRINT "DOES: 01-01" 3-0
146 1170 PRINT "DOES: 01-01" 3-0
147 1180 PRINT "DOES: 01-01" 3-0
148 1190 PRINT "DOES: 01-01" 3-0
149 1200 PRINT "DOES: 01-01" 3-0
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154 1250 PRINT "DOES: 01-01" 3-0
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166 1370 PRINT "DOES: 01-01" 3-0
167 1380 PRINT "DOES: 01-01" 3-0
168 1390 PRINT "DOES: 01-01" 3-0
169 1400 PRINT "DOES: 01-01" 3-0
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217 1880 PRINT "DOES: 01-01" 3-0
218 1890 PRINT "DOES: 01-01" 3-0
219 1900 PRINT "DOES: 01-01" 3-0
220 1910 PRINT "DOES: 01-01" 3-0
221 1920 PRINT "DOES: 01-01" 3-0
222 1930 PRINT "DOES: 01-01" 3-0
223 1940 PRINT "DOES: 01-01" 3-0
224 1950 PRINT "DOES: 01-01" 3-0
225 1960 PRINT "DOES: 01-01" 3-0
226 1970 PRINT "DOES: 01-01" 3-0
227 1980 PRINT "DOES: 01-01" 3-0
228 1990 PRINT "DOES: 01-01" 3-0
229 2000 PRINT "DOES: 01-01" 3-0
230 2010 PRINT "DOES: 01-01" 3-0
231 2020 PRINT "DOES: 01-01" 3-0
232 2030 PRINT "DOES: 01-01" 3-0
233 2040 PRINT "DOES: 01-01" 3-0
234 2050 PRINT "DOES: 01-01" 3-0
235 2060 PRINT "DOES: 01-01" 3-0
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237 2080 PRINT "DOES: 01-01" 3-0
238 2090 PRINT "DOES: 01-01" 3-0
239 2100 PRINT "DOES: 01-01" 3-0
240 2110 PRINT "DOES: 01-01" 3-0
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267 2380 PRINT "DOES: 01-01" 3-0
268 2390 PRINT "DOES: 01-01" 3-0
269 2400 PRINT "DOES: 01-01" 3-0
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AMAZING NEW TOTAL BACKUP CARTRIDGE FOR COMMODORE 64 AND 128 (IN64+MODE)

NEW ACTION REPLAY V.3 FROM DOSOFT  
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**100% SUCCESSFUL**  
WE ASK, WHO'S  
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# Games Reviews

*There are some fast and furious games this month and some more leisurely titles for you to dip into.*

## CLASSIC SNOOKER

**H**ere's a chance for budding Jimmy Whites to try and emulate their great ballie heroes and all from the comfort of their own home. Classic Snooker has enough options to keep even the most devoted fan quiet during the odd hour where, due to some unfortunate error in the programming schedule, there isn't actually any of the real stuff on the box.

There are three skill levels and you can choose to play either against a friend or the computer. Control of the game is simplicity itself. Position the cueball in the 'D' if necessary, select the angle of the shot, decide what, if any, spin you want to impart on the cueball and finally select the power required. If you pot a red, you are prompted for a colour and this is simply a matter of moving the cursor over your choice. Data file of the scores, current break and highest break, to date are displayed below the table. There is an edit mode included in the program so you don't have to play a full game if you don't want to or you can set up and practice all those fancy trick shots.

The only problem with the game, and unfortunately if you agree me, is that the balls are far too active when hit. You

only have to break into the pack at half speed and you are treated to balls whizzing all over the table in the most amazing flaunting of Newton's Laws of Motion. You certainly have more than enough time to chalk your cue between shots.

All this is a pity because it totally ruins the playability of what is otherwise a well presented game. A brave effort but one that has sadly miscued. **G.R.H.**

## Taunting

**Title:** Classic Snooker. **Medium:** C64. **Supplier:** Amos, 33 West Hill, Barnham, Kent BA3 2EL.

**Originality:** 1/10. **Graphics:** 6/10. **Playability:** 2/10. **Value:** 4/10.

## KNUCKLEBUSTERS

**B**y the year 2000, more than one in three of the adult population was in prison after years of riots and civil disobedience. Overcoming was effortless by the simple





expedient of using chemistry on the surgeon's knife to remove any offending part of mind or body. This is how produced thousands of socially useful androids who were used to patrol the less savory sections of the city and who had instructions to kill on sight any escaping prisoner. Not as you might imagine by the simple method of blowing their brains out, but rather by hand-to-hand combat which at least afforded the prisoner a fighting chance. But who am I to argue as without such the brilliant plans as these, computer games would be so much the poorer?

As it happens, one such prisoner was trying to escape (I bet that surprised you). You play the part of Delc in this latest beat-'em-up from Melbourne House. In order to gain your freedom, you must sneak through six zones of the city, hiding or avoiding the androids as you see fit. The zones include the cell block, guard area, prison wall, city, down town and the outer wall. Available actions are run left and right, jump and drop, punch and kick. There are five different types of android to encounter as well as potentially useful items hidden behind doors and in barrels. All this must be done against the clock as you managed to sabotage the prison computer causing the entire city to self destruct. As a hint as to how much time you have got, it may be coincidental that Ron Hubbard's sound track lasts for 17 minutes.

And that's all there is to it. The graphics are so-so, the gameplay dreadful. Save your money. **G.R.H.**

#### Touchline

**Title:** Touchline. **Machine:** C64. **Supplier:** Melbourne House, 60 High Street, Hampton Wick, England-upon-Thames, Surrey KT1 4SB.

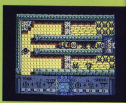
**Originality:** 3/10. **Graphics:** 6/10. **Playability:** 3/10. **Value:** 3/10.

#### DANDY

**T**ry this storyline for size. One or two players working as a team rush like mad through 12 dungeons, knocking the stuffing out of an enemy nasty, evil monster as possible and pausing only to pick up treasure, keys and the odd hint to keep your strength up. Sound somewhat familiar? Yes, it's *Guns*... says Dandy, a Gauntlet clone from Electric Dreams.

The two characters are Thor and Shiba, two not very nice characters, all brains and no brains. They can withstand a considerable amount of damage before even they succumb to the forces of evil. Unfortunately, the vast hordes of nasties are intent on cutting you to ribbons, a slice at a time. What is worse, these creatures of dark seem to come in an unlimited supply thanks to the fact that there are monster generators scattered liberally around each dungeon. If you can destroy every creature on a particular screen, you can also destroy the generator so that they plague you no longer.

Food is only one of the vital goodies to pick up on your travels, restoring as it does your battle weary body. Keys are just as important as they are required to allow you access to other parts of the dungeons. Beware as they can be destroyed by shooting them and if you are not careful in the thick of battle, you may well find yourself cut off! Spells can be found and these have the random effect of killing, disorientating or



paralyzing the enemies. Treasure has no real function apart from being something to make your journey worthwhile. In an emergency, you can trade your treasure for energy. The are teleports to be used and completion of a set of changes gives you a clue to solving a riddle.

All the backgrounds are bright and colourful and there are plenty of creatures standing round the screen at any given point but the overall effect is to make the screen look very messy. Compare this to Gauntlet where the screen is a lot simpler but looks a lot better for it. Not a bad game, but missing that certain spark that makes it a great one. **G.R.H.**

#### Touchline

**Title:** Touchline. **Machine:** C64. **Supplier:** Electric Dreams, 1 Carfax, Covent, Southampton SO1 2BH.

**Originality:** 6/10. **Graphics:** 6/10. **Playability:** 7/10. **Value:** 3/10.

#### RED MAX

**A**ll you have to do to complete the game and save the Astronworld is to deactivate 25 fusion reactors on the surface (find the 140 and turn on right backup make-way reactor systems in the engineering area, shut down four power plant and finally re-assemble nine crew members in the laboratory complex). This shouldn't be a problem as you're riding Red Max!

The Astronworld is one of a group of anti-gravity colonies sent out to engage the Sun as it began an unexpected Nova cycle. Sadly past the Sun the mission went bad, wrong when members of the Renegade Death Lords landed and sabotaged the power plants. The alarms sounded and now you must ride Red Max to the rescue.

The game plays like a sequel to Blastarion's The Last VR as you drive your bike around the planet's surface in the top half of the screen while monitoring controls in the bottom half.

The planet surface is packed with traps to hinder and destroy your efforts. These include laser fences and gas biological mines as well as the buildings that destroy you or





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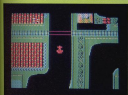
control. My favourite screens are in the underground scenes in which you must drive through lakes and rivers that try to drag you along with the current.

Red Hot is yet another highly addictive budget game that drives you back for another game, again and again.

G.R.

#### Fourkline

*Title:* Red Hot. *Supplier:* Code Masters, 1 Rosemont Rowbury Court, Rosemont Chase, Rowbury, Oxon OX10 7ET. *Machine:* C64. *Price:* £7.98. *Originality:* 4/10. *Graphics:* 3/10. *Playability:* 5/10. *Value:* 9/10.



#### STREET MACHINE

Yet another racing simulation game. You control a high-powered turbo-charged ultimate automobile although you would not think it to look at the screen which depicts an overhead view of you and the other seven cars as you drive round a scrolling track. The cars look like scraped-down Datsuns.

Your race is split into three sections - normal conditions, explosion and icy. Control is straightforward. Accelerate, decelerate, left, right and brake. The usual objective is to get

round the course as fast as you can but there is no indication of how well you were doing before you wrote off your vehicle. Even a simple 'You have travelled a mile' on a high score table would help considerably.

Major crashes result in your car exploding and game over time. Minor bumps and general wear and tear can be fixed although it costs you time. A two-page menu is presented showing all the various bits of your car and the amount of damage that they have accrued. Anything that is more than 80% damaged must be fixed. This involves moving the cursor to the right a bit and waiting. Damage is repaired with time and you are limited as to how much time you have available. This part of the game is dull to the extreme - it is just a case of looking down the list for high numbers. The name of the part is irrelevant.

This game is neither original nor addictive. It would have been reasonable if it had come out in 1983 but now, it looks very dated. In the company game Grand Prix, Street Machine hardly makes it over the starting line.

G.R.H.

#### Fourkline

*Title:* Street Machine. *Supplier:* Software Innovation, P.O. Box 43, 63. *Originality:* 2/10. *Graphics:* 3/10. *Playability:* 3/10. *Value:* 3/10.



#### BLOOD 'N GUTS

Death in barbarian style is the subject of the latest game from Finnish software house American Action. The game that promises all of the violence and brutality you've ever dreamed about features 80 action contexts in which the loser literally loses his head (thanks to a handy on position guideline!)

You can select your athletes from the motley collection of Kruor, Hanch, Nop and Deg who does battle against either a human or computer opponent in challenges where the ancient art of jousting wrestling is crucial to victory.

The contestants are tested to the full by events that examine their strength, accuracy and coordination in front of a critically silent crowd.

During the contest they compete in a tag of war where the loser ends up in a river, the loser jumps where a suspended trapeze must land on his head and the polelight over a rising



when the boxer takes a dive!

A barbarian in stacks flows the live target for the human hit event in which the player must hurl rocks at his nose, arms and legs. In the end throwing the barbarian get a chance to throw axes at each other and in the end throwing a poor meagly hammer through the air and lands dangerously close to a hungry looking crowd.

My favourite event is the beer drinking in which our heroes must quaff three barrels of beer without spilling a single drop. A mixture of timing and wiggling are required to drain the barrel and deliver the victory belch before your opponents cleaned the froth. Finally, three rounds of arm wrestling end the contest with a signal delivering the final blow to the loser.

Each event is supported with "Tut" graphics such as a cross section of a barbarian head so that you can control the flow in the beer drinking and moments of the players during the mountain walk to construct any loss of balance.

Overall the game is good fun to play despite it's raw appearance and makes a welcome change from the slopes, fields and tracks of the more serious sports simulations.

T.H.

### Touchline

**Title:** *Blond'n Gun*. **Supplier:** American Action, Box 10866, 260 41 Midway, London. **Machine:** C64.

**Originality:** 5/10. **Graphics:** 6/10. **Playability:** 5/10. **Value:** 6/10.

### HYPA-BALL

**I**t's the day of the Odin Super Cup and a trismic clash between the Hawks and Vipers. You captain the Hawks in the ultimate team game in the Universe - Hypa-Ball.

Before the match can begin you must choose your team from the pool of 18 players knowing that the compromised vipers are just as eager to snap up the stars. You can judge a players abilities from his strength, speed and agility ratings as you scroll along the likes of Alex Grant, Frodo Flange and Sir Clobbering.

After a few disastrous games when you're slaughtered in the 10 minute matches, you'll begin to see which are the best

players as the computer will pick these ones. However as you get first pick you should soon be in with a chance.

The Hypa-Ball stadium is split into two halves by a central pole along which the goal ball relentlessly moves up and down at a constant rate. At either edge of the screen the pitch is bounded by a force field that teleports the star playing ball into the other half.

After a quick twist from the cheerleaders the players take their position. The strike ones and two hoover on either side of the pole and are restricted to that half of the field, who run the grounds can move where he wants to as long as he keeps his feet on the ground. The match begins as the ball is fired into play.

Joystick controls move our wits and the groundsman at any one time. This takes a while to get used to but soon you'll be chasing ball. Once you catch it you have to think quickly as you've only got 2.5 seconds to get rid of it otherwise you'll concede a penalty and a certain goal.

Goals are scored by firing the ball at the goal but since it's a moving target this isn't easy. In a 10 minute match against a good computer opponent your concentration must be total as the slightest lapse will let him in to score.

A fast and furious, futuristic sports game supported by super sounds and speedy gameplay.

T.H.

### Touchline

**Title:** *Hypa-Ball*. **Supplier:** Odin, 74 New Oxford Street, London WC1A 1PS. **Machine:** C64.

**Originality:** 5/10. **Graphics:** 5/10. **Playability:** 5/10. **Value:** 5/10.

### ROBOT RASCALS

**R**obot Rascals is the latest game to be released by Electronic Arts (through Aristonsoft) and is a game that's half computer game and half card game!

Basically, the game is a multi-player treasure hunt with a hand of cards deciding what the players are looking for. Four cards are dealt as the program is loaded in. Then the players select one of the 10 robots that would such be at home in Electronic Arts's classic game M.U.L.E. Although they are visually different, there doesn't seem to be any difference in their strengths or abilities.

Each turn, each player gets to move his robot around the alien world of Laurusdward seeking out their selected artifacts. Moving through rocks or trees costs more energy than strolling through the plains. Either way this energy is deducted from the robots turn allowance. When all the energy has gone the turn is over. As well as moving a robot can scan for one of the 24 items that range from a denim disk to a digital alarm. The robot then spins around (the quicker the spin the closer you are to the object) and finally points in the direction you need to go in. Collect all four objects and return home (in the center of Laurusdward) and you've won the game.

Unfortunately, it isn't that simple as the other players are out to stop you. There's another pack of cards, the luck cards, that can force you to show your hand to the others, allow you to swap one of your cards for somebody else's or get everyone to swap with the descriptive "pass the trash







card". All this wheeling and dealing is necessary as some cards (and the objects they represent) are better than others such as the Super Shield and Velocity Vitamin that add to your robot's powers whereas the Energy Kater and Action Anchor slow you down. There's even a killer card that stops you from winning, unless you can pass it on to someone else. This card gets passed around a lot.

The mischief doesn't end with cards as you can also get your robot to go and mug the other players by ransacking them and the stealing what you want but you can also use energy to build shields to protect yourself from muggers.

Finally just as you thought you had things under control (maybe almost one of its global tactics such as slowing down all movement or increasing the energy and stopping your plan).

A fun game for all the family that is best played with the maximum four players to allow maximum scolding. Believe me this can get vicious as people have been known to drop objects that I've wanted at the bottom of lakes just to postpone my victory celebrations but don't worry I'll get revenge.

T.H.

#### Toolbox

**Title:** *Robot Ransack*. **Suppliers:** Electronic Arts (Artissoft), 44 Long Ave, London WC2E 9NW. **Machines:** C64/disk. **Price:** £18.95.

**Originality:** 3/10. **Graphics:** 7/10. **Playability:** 8/10. **Value:** 7/10.

## LIGHT FORCE

**P**laying a lone LightForce fighter craft, here is yet another scenario giving you the chance to put the wrongs of the Universe to right. This time, the object of your mission is simple as you attempt to wipe out an alien force that has seized a Terrain-sited system on the edge of the galaxy. You take it's another shoot-em-up.

Why is it that whenever there is any sort of trouble, you are the only person around capable of sorting it out? This time, the 'trouble' comes in the form of a few thousand alien

ships and ground defenses spread over such divergent landscapes as jungles, asteroid belts and ice-planes.

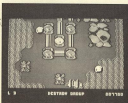
Despite the unoriginal storyline, LightForce plays very well indeed. The graphics, while not quite as stunning as the Spectrum version, are still noteworthy. The game itself is basically one of learning the patterns of the airborne alien while at the same time, manoeuvring yourself into a position whereby you can blast the ground targets. Your task is made most tricky as these need several hits to destroy them. They are vital though. Take out four control centres and you earn yourself a most welcome extra life. Apart from your twin lasers, there are other special weapons to be found and activated as you continue your aerial Rambo act.

**Faster Than Light**, the company producing LightForce has managed the one ingredient that makes shoot-em-ups stand out from the crowd. This game is incredibly addictive. Couple that with the on screen effects and LightForce becomes an essential purchase for anyone who enjoys a fast blast.

G.R.H.

#### Toolbox

**Title:** *LightForce*. **Supplier:** *Faster Than Light*. **Supplies:** Amstrad, Eas, Tapes, West Midlands DY4 7JJ. **Machines:** C64. **Price:** £9.95. **Originality:** 5/10. **Graphics:** 8/10. **Playability:** 9/10. **Value:** 8/10.



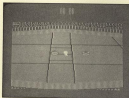
#### Xeno

**D**eveloped from a game played by platinum miners, back in the 13th century, Xeno was originally a game with few rules and considerable violence. The basic idea was a fairly traditional one - try to hit a pack into your opponent's goal more times than he managed to do the same to you. If the pack or you happened to hit the opponent, tough luck!

In today's sanitised version, the game has become a huge spectator sport, the rules have been tidied up somewhat and champions become legends overnight. Xeno is your chance to become one of the sporting heroes of the galaxy.

The game is a sort of again-again hockey. Each player controls a disk and takes it in turn to fire it anywhere on the lozenge shaped rink, the ultimate objective being to knock the pack into your opponent's goal. You can try and hit the





quick direct, knock your opponent's disk out of the way or try to block his shot. The game is played over four quarters and the person with the highest score is the winner.

Playing Xeno is simplicity itself - you simply move a small arrow around the pitch, press fire and your disk travels in the appropriate direction. The game can effectively become user defined as there are a number of variables that you can fiddle with: one or two players, the length of each quarter, the amount of time between shots and a handicapping system for the computer. In practice, the default values work as well as any others and lead to a fast and furious game although not one in which you will be beaten out of sight by the computer.

Xeno is a well implemented, simple game that is great fun to play.

G.R.H.

#### Touchline:

**Title:** Xeno. **Supplier:** B&F, Victory House, Leicestershire Place, London EC2M 3BA. **Tel:** 01 439 0688. **Machine:** C64. **Price:** £8.95. **Originality:** 5/10. **Graphics:** 6/10. **Playability:** 8/10. **Value:** 6/10.

while over estimating can result in huge polling bills and lecture from your chairman.

Except for cup matches, watching games is optional and if your side is having a particularly poor spell then you may wish to watch another game from another division. The simulation is rather lengthy and takes about 15 minutes to all but commentary of the game helps identify the quality of your players.

After each game you are given the scores, scorers and attendance figures for all matches. The attendance figures and playing squads were selected from the 1993-94 season and add a very up to date dimension to the game.

Overall 'The Double' is an exceptionally realistic game and an absolute must for any football fan but it is at times rather slow and time consuming.

S.K.

#### Touchline:

**Name:** The Double. **Price:** £10.95. **Machine:** C64. **Supplier:** Johnson Systems Ltd, Tel: 0934 22664/417788. **Originality:** 4/10. **Realism:** 9/10. **Playability:** 5/10. **Value:** 5/10.



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## THE DOUBLE

**E**very football manager's dream is to achieve the 'double', by winning both the league and FA Cup in one season. This achievement has only been done five times in the history of English football but here you can try and make it six with this new football simulation game from Simulation.

Being a football fan myself I can honestly say that this is by far the most realistic game of its kind I have come across. All the usual gameplay features are included with this type of game, but this particular one has many better features than its rivals.

Included among the options are ones that allow you to employ scouts to report on any team or player from any division and a physiotherapist to help nurse your injured players. As well as coping with the team problems you are asked to deal with the running of ground improvements, sackings, wages and even estimating your attendance. Underestimating the crowd can result in terrace brawls

## CHAMELEON

**I**n what Electric Dreams describes as a "surreal" arcade adventure, you are Chameleon. Made from Maa and Plex, the fabric of time, you must avert the four realms of Fire, Earth, Air and Water and do battle with the demons that now rule there. These demons were created by an evil man to master the powers of nature and so wreak havoc on the Earth with freak storms, blizzards and dust storms.

Using your flux you can smother the demons and defeat them in combat while repairing the damage caused by the tainted flux.

During your quest you must journey through these strange realms and seek out the tainted flux that can be found only in a certain place and a specific time of day. Luckily, you are fitted with warning beacons that sound when you meet one of the criteria, then it's merely a matter of lighting off the demon onslaught until you can progress to the next realm.

The game features a similar mock 3D display as found in Gremlin's Way of the Tiger as the Chameleon rolls past an assortment of energy draining pools and holes and





background deserts, pyramids, trees and mountains.

Constant attacks from the dragon flames, rockslabs, rotors, blizzards and deathballs drain your thin energy lifeforce which can be replenished by collecting the sparklers that are left if you blast the Super Demons.

Underneath this surreal road of rotors, flux and limbo lies a surprisingly easy, shallow and ordinary arcade adventure.

T.H.

#### Teacher

*Title: Classroom. Supplier: Electric Dreams, 17 Carlton Circus, Southampton SO1 1EW. Tel: 0703 179084. Machine: C64.*

*Originality: 6/10. Graphics: 5/10. Playability: 5/10. Value: 5/10.*

#### HEARTLAND

**T**he strangest things can happen when you read a book that you found in the attic. This one was all about an overweight wizard that saved a magic land from the evil antics of the Warlock Miden. As you near the end of the book you realise that the last six pages are missing! Then to your horror you find yourself in the land you were reading about and dressed in the wizard's ostentatious clothes and armed only with a self-repeating top hat.

Your mission is to search the strange platforms and portals of the Heartland for the missing pages so that the evil land (Heartland) has a happy ending. However Miden knows of your presence and has sent his minions to get you. These consist of the spinning wizards and the indiscriminate gooches that chase you even after you've blasted them into a pile of bones.

Your mission is further hampered by the energy draining stars and bubbles that float above the platforms and six dark pages that detail a different end to the book involving lots of C64 for you and the Heartland.

Help is at hand in the more powerful weapons that you can find such as swords and fireballs as well as other stars that give you temporary immunity and a hat that transports you from one scene to another. Despite this the hand of Miden isn't far away and gets even closer every time one of

his minions or spells reach you until his face appears at the top of the screen ending your game.

Heartland is an excellent arcade adventure featuring some exceptional graphics particularly of the crumbling minions as they disperse into a pile of bones.

T.H.

#### Teacher

*Title: Heartland. Supplier: Delta, First Floor, 74 New Oxford Street, London WC1A 1PS. Machine: C64.*

*Originality: 5/10. Graphics: 5/10. Playability: 5/10. Value: 5/10.*



#### SKY RUNNER

**B**y the 21st Century man was spread throughout the galaxy and at last the governments had found a drug to control him.

This was the result of years of research and countless failures as previous drugs had left golden pigs in a brainless daze. Then on a single planet called Niabomolus they actually found it growing on trees. Seventy per cent of the planets trees had fruit containing the drug Sky.

Fleets of Sky Runners riding their Sky Bikes was dispatched to harvest the drug protected by the laser firing towers that were built to protect them.

Although necessary (normal policing methods didn't work) control drugs were still illegal. You are part of the Runner Squad that was formed to subvert the Sky running on the fabled world.

As you're paid by results you set off to trash as many bikes as possible. The game begins as your skimmer lands on the planet.

Your first problem is to take out the laser towers that protect the Sky collecting bikers. With your single skimmer you must out-gas the towers by blasting them in high speed attack runs. Only then can you land and drop your first of three bikes.

Changing through the trees (that are as deadly as the towers if you crash into them) you must track down and



destroy the Sky Bikers but you must take care not to destroy your fellow runner squad men.

Unfortunately, even the eight different threats or skill levels do nothing to save a game that is bland and reminiscent of a four year old Spectrum game! **T.H.H.**

### Touchline

**Title:** Sky Runner, Suppliee: Cascade Games, Harrogate, YO17 5BG, Machine: C64.

**Originality:** 4/10, **Graphics:** 5/10, **Playability:** 5/10, **Value:** 5/10.



### STARGLIDER

**S**targliders, the game that features vector graphics arcade action, comes in a box with a 64 page novel, poster and key guide and was every possible available in its previous versions, is at last available on the C64.

The Star Glider in question isn't the craft that you fly by peering at its on screen controls but giant birds that tend to the downfall of the planet Novemia. These birds migrated through space to Novemia and were fired by the planets Sentinel "zap anything" defense system until an attack of



conservation, reprogrammed the Sentinels. Unfortunately they also let in the Star Glider shaped Ergon attack fleet that devastated the defenceless planet. Luckily, you were on a nearby moon and have found an ancient airborne ground attack vehicle (AGAV) and have gone to the rescue.

There's no great strategic aim to be fulfilled as your job is simply to destroy all you can before they finally get you. You find you can use the planet's initial, warm and repair facilities that should improve your chances.

Using a combination of keyboard and joystick controls you must fly your AGAV and do battle with a collection of alien craft that include the Star Wars inspired walkers and stompers, tanks, mines, missile launchers and the flapping Star Gliders. Most take more than one shot to kill and some such as the stompers can only be destroyed by firing a missile that you must guide to the target through a separate display.

An excellent game that has been ruined by poor programming. **T.H.**

### Touchline

**Title:** Starfighter, Suppliee: Rainbow, Leam, 74 New Oxford Street, London WC1A 1PS, Machine: C64, Price: £14.95.

**Originality:** 4/10, **Graphics:** 7/10, **Playability:** 4/10, **Value:** 6/10.

### 10th FRAME

**T**en pin bowling is the name of the game in this latest sports simulation from the Access/US Gold stable. 10th Frame allows up to eight players to have a go at knocking over as many skittles as possible on either a league or one off basis.

For the uninitiated, ten pin bowling involves rolling a huge ball down an alley as you attempt to knock over 10 skittles. You get two attempts to do this. If you succeed in knocking them all down with only one ball, this is known as a strike. Take two balls and it becomes a spare. The score of a high score is to make sure of getting your spares.

In order to launch a ball, you must first select an aiming point and position your arm on the lane. Keeping the fire button pressed will start a bar moving up a scale as you determine the speed of your release. Two small markers determine the safe upper and lower limits for an accurate throw. The bar then slides quickly down the right hand side of the scale and you must press again to stop on one of the three markers - straight, slight hook and maximum hook. Release your press and your ball is likely to make an early roll into the nearest gutter.

Graphically, the game is a little disappointing. The effects of the skittles falling down is well done but the lane is small - one fifth the width of the screen. The worst part is the sliding scale. Yellow on orange proved very hard to see, especially under artificial light.

10th Frame is a highly accurate simulation of 10 pin bowling but lacks a little in additive graphics. **G.R.H.**

### Touchline

**Title:** 10th Frame, Suppliee: US Gold, Derby S/L, Nottford Way, Holford, Birmingham B6 7AE, Machine: C64, Price: £9.95.

**Originality:** 5/10, **Graphics:** 4/10, **Playability:** 7/10, **Value:** 7/10.



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- |      |         |         |         |
|------|---------|---------|---------|
| 1. E | 100.000 | 100.000 | 100.000 |
| 2. E | 100.000 | 100.000 | 100.000 |
| 3. E | 100.000 | 100.000 | 100.000 |
| 4. E | 100.000 | 100.000 | 100.000 |
| 5. E | 100.000 | 100.000 | 100.000 |
| 6. E | 100.000 | 100.000 | 100.000 |

**Handwritten:** *Handwritten text, possibly a signature or name, in cursive script.*

**Direct Prices** **Offer 5**  
**for Printer Ribbons**

For printer friendly version

[illegible]

1. *Journal of the American Medical Association*, 1997; 277: 103-107.  
 2. *Journal of the American Medical Association*, 1997; 277: 108-112.  
 3. *Journal of the American Medical Association*, 1997; 277: 113-117.

### Offer 7

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For quality, reliability and security, there's no 3M. 3M's 3M Systems always does the best job. In fact, it's not even 3M. The 3M Systems is 3M.

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Simple Interest	Compound Interest	City
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\$25,000	\$50,000	150 students
\$30,000	\$60,000	200 students
\$35,000	\$70,000	250 students
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**Reversible Media Life**  
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Synthetic equivalent is not.  
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**Offer**

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1. Dial 1-800-4-A-DEAN on 24-HR 7/24, and give your MOOSE ID or NABA number and expiry date.
2. Send your charge card to Direct Clinic Supplies Ltd.
3. Official Orders, Group-Bids orders from Universities, Colleges, Schools, Churches, etc. are very welcome.



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# Cribbage

*If you've ever played cribbage then you'll know just what an addictive game it is and if you haven't then try our Plus/4 version of the game*

*By Hugh McGhee*

**C**ribbage is one of the most popular pub card games in this country, but have you ever considered trying to beat your computer instead of hounding against the champ down at your local? Now's your chance, if you've got a Plus/4.

## Instructions

It is assumed that the player knows how to play cribbage. The rules are exactly those given in *Wayle's Rules of Games*. Since some aspects of scoring points vary from region to region, the points scored in this version will be recounted in this introduction. The following points should thus be noted.

- 1) Due to the layout of the cards K is used to represent a 10.
- 2) Input is handled by means of a joystick in port two. When asked to play or discard a card, simply move the marker which appears above the cards to the required position and press the fire button. When entering your points, moving the joystick < right > and < left > increases and decreases the points counter respectively. Once again pressing fire enters your response. The program is protected against attempts to discard or play the same card twice. Attempts to claim too many points produce an error message. The Plus/4 always claims the correct number of points for itself but, if you don't claim all your points, the Plus/4 will steal them.
- 3) Each player is dealt six cards and must discard two cards into the crib. The Plus/4 plays a simple strategy choosing its best four cards after consideration of the two cards it is discarding. The cards are shuffled after every hand but only cards are shuffled out of the pack to save time. The program differences between dealer and non-dealer. The player who doesn't have the crib always receives the first card.
- 4) The Plus/4 runs the cards for the initial crib. The lowest card wins. Note that in this game the ace always counts as one. Illegal combinations are not allowed so two aces of spades, for example, will not be displayed. This however, such as both players entering a two of different suits, are permitted, in which case the event will be performed again.
- 5) The first player to obtain 121 points or more wins.
- 6) Note that in the run up the Plus/4 will check your cards if you say you can't go. This is the only time the Plus/4 examines your cards but it does not cheat. Any discovery of an ability to play after entering 'can't go' will produce an error message, as will an attempt to play a card that would result in a total excess of 31. The Plus/4 does not play a strategy in the run up except that it will always make the total 30 if it can. It will not, however, always make the total 15 even if it can.

- 7) The ending of a go in the run up has proved the most tricky operation in practice. If the player plays last the Plus/4 does not know that the player cannot go unless the total is 31 as the last card has been played. Otherwise the player must enter 'can't go' before entering the last point.

Points are scored as follows:

- A) Two points for any pairs, six points for three cards of a kind and 12 points for four cards of a kind.
- B) Two points for any combination of cards totalling 15, counting picture cards as 10.
- C) For any run of three or more cards, count one point for each card in the run.
- D) For obtaining a total of 15 or 31 in the run up, score two points.
- E) For playing the last card in any go in the run up, score one point.
- F) For a flush of four cards in your hand, score four points. Note there are no points for a flush or four in the crib.
- G) For a flush of five, either in your hand or in the crib, score five points.
- H) If the starter card is a jack, and it is your crib, add two points when counting your hand in the main game.
- I) If you have a jack either in your hand or in the crib of the same suit as the starter card, count one point.
- 8) The game is played on the high resolution screen to facilitate the different background colours.

## Variables

The array C(4,100) has four rows and



14 columns. Columns one to 13 hold hold the denominations of the cards from ace through to king. The zero element of each row holds the suit for that row. The suits are, in order, spades, hearts, clubs and diamonds.

The 13 cards shuffled out of the pack for each hand are placed in the SHUFF array. This has two rows of 13 columns, row zero holding the denomination of the cards and row one their respective suits.

The array C8sum is four rows and six columns. This holds the initial six cards dealt to each player. The Plus/4's denominations and suits are in rows zero and one respectively, the denominations and suits of the player's cards are in rows two and three respectively.

The array P8sum is used after the discard has taken place. It has six rows of five columns and is the major card array used in the game. The first four elements in rows zero, two and four hold the denominations of the four cards in the Plus/4's hand, player's hand and the crib respectively. The associated suits are stored in the first four elements of rows one, three and five. At the commencement of the main game, the fifth element of each relevant row will be occupied by the denomination and suit of the starter card, which is used by all hands.

The face values for the deck of cards are stored in the array F8sum, a row zero holding the values one (for

The major scalar variables are as follows:

MP—	Plus/4's points
YP—	Player's points
TP—	Used in run up to indicate number of cards played in the current go.
T—	Used to total the points in the points count routine. Also used in the run up to hold the total face values in the current go.
PO—	Used in the run game to hold the total points count being the sum of T above and the result of checks for flushes, jacks etc. Also used to hold points scored in the run as T is otherwise engaged.
ML—	Flag used to indicate who played the current card in the run up. If ML is one then the Plus/4 played last, and if ML equals two the player did.
IC—	Flag used in the run up to indicate whether or not the Plus/4 can play a card. The Plus/4 is able to play a card whilst IC is equal to one and unable to go if equal to zero.
YC—	Serves the same purpose as IC for the player.
MCL, YC—	These two variables hold the number of cards played in the run up by the Plus/4 and the player respectively.
WC—	Signifies who holds the crib. If set to one then the Plus/4 has the crib and if set to two the player has the crib.

the ace) to 13 (for the king), whereas row one holds the values one to 10 (for the purpose of counting 10s).

The respective values of the shuffled cards are placed in the array S8sum, after shuffling. The values are transferred to C8sum, after dealing the cards and are finally stored in the Y8sum array after the discard. The arrays S8sum, C8sum and Y8sum have exactly the same format as the SHUFF and P8sum arrays described above.

The array R8sum is used by the sorting routine for run checks. The

sorted cards are placed in row one and after transfer by the sorting routine into row zero. That row is sorted into ascending order.

The arrays M8sum and Y8sum are row vectors each containing four elements. These arrays are used in the run up, and, a non-zero element indicates a played card. As is general in this program, any variable prefixed by the letter M indicates a value used by the Plus/4, whereas variables associated with the player are prefixed with a Y.

TE

#### PROGRAM: CRIMINAL

```

1000 DEF F8(2)=1870000(1)+21+1
1010 GOSUB 10400:GOSUB 10410
1020 GOSUB 10110:GOSUB 10170
1030 GO
1040 GOSUB 1018
1050 GOSUB 10430+GOSUB 10440+GOSUB 10450
1060 IFP=120000(1)+1870000(1)
1070 GOSUB 10410+GOSUB 10410
1080 GOSUB 10110+P(180000+12)
1090 GOSUB 10430
1100 TP=4+2+2+6+4:G8=200+0,12+5
1110 G1=121+GOSUB 10170
1120 F8(4,4)=G8:F8(4,1)=G8+V1
1130 F8(4,2)=121+V1+1,1+V1+1,12
1140 NEXT
1150 TP=27000(1210
1160 A=1+P(4+GOSUB 10430+IFP+G8
1170000(180
1180 G8=18+28+24+2+0:GOSUB 101
0
1190 G8=F8(4,1)+P(4+G8+G8+G8
1200 GOSUB 10430
1210 A=1+P(4+G8+G8+G8+G8+G8
1220 A=1+P(4+G8+G8+G8+G8+G8
1230 GOSUB 10430
1240 IFP(4,1)=1+G8+G8+G8+G8
1250 NEXT
1260 IFP(4+G8+G8+G8+G8+G8+G8
1270 FOR=1:ELSE IFP(4+G8+G8+G8
1280 FOR=1:ELSE IFP(4+G8+G8+G8
1290 IFP(4,1)=1+G8+G8+G8+G8
1300 NEXT
1310 FOR=1:ELSE IFP(4+G8+G8+G8
1320 FOR=1:ELSE IFP(4+G8+G8+G8
1330 IFP(4,1)=1+G8+G8+G8+G8
1340 NEXT
1350 FOR=1:ELSE IFP(4+G8+G8+G8
1360 FOR=1:ELSE IFP(4+G8+G8+G8
1370 FOR=1:ELSE IFP(4+G8+G8+G8
1380 IFP(4,1)=1+G8+G8+G8+G8
1390 NEXT
1400 GOSUB 10110,12,0
1410 FOR=1:ELSE IFP(4+G8+G8+G8
1420 IFP(4+G8+G8+G8+G8+G8+G8
1430 FOR=1:ELSE IFP(4+G8+G8+G8
1440 FOR=1:ELSE IFP(4+G8+G8+G8
1450 FOR=1:ELSE IFP(4+G8+G8+G8
1460 FOR=1:ELSE IFP(4+G8+G8+G8
1470 FOR=1:ELSE IFP(4+G8+G8+G8
1480 FOR=1:ELSE IFP(4+G8+G8+G8
1490 FOR=1:ELSE IFP(4+G8+G8+G8
1500 FOR=1:ELSE IFP(4+G8+G8+G8
1510 FOR=1:ELSE IFP(4+G8+G8+G8
1520 FOR=1:ELSE IFP(4+G8+G8+G8
1530 FOR=1:ELSE IFP(4+G8+G8+G8
1540 FOR=1:ELSE IFP(4+G8+G8+G8
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1560 FOR=1:ELSE IFP(4+G8+G8+G8
1570 FOR=1:ELSE IFP(4+G8+G8+G8
1580 FOR=1:ELSE IFP(4+G8+G8+G8
1590 FOR=1:ELSE IFP(4+G8+G8+G8
1600 FOR=1:ELSE IFP(4+G8+G8+G8
1610 FOR=1:ELSE IFP(4+G8+G8+G8
1620 FOR=1:ELSE IFP(4+G8+G8+G8
1630 FOR=1:ELSE IFP(4+G8+G8+G8
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1650 FOR=1:ELSE IFP(4+G8+G8+G8
1660 FOR=1:ELSE IFP(4+G8+G8+G8
1670 FOR=1:ELSE IFP(4+G8+G8+G8
1680 FOR=1:ELSE IFP(4+G8+G8+G8
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1700 FOR=1:ELSE IFP(4+G8+G8+G8
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1790 FOR=1:ELSE IFP(4+G8+G8+G8
1800 FOR=1:ELSE IFP(4+G8+G8+G8
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1880 FOR=1:ELSE IFP(4+G8+G8+G8
1890 FOR=1:ELSE IFP(4+G8+G8+G8
1900 FOR=1:ELSE IFP(4+G8+G8+G8
1910 FOR=1:ELSE IFP(4+G8+G8+G8
1920 FOR=1:ELSE IFP(4+G8+G8+G8
1930 FOR=1:ELSE IFP(4+G8+G8+G8
1940 FOR=1:ELSE IFP(4+G8+G8+G8
1950 FOR=1:ELSE IFP(4+G8+G8+G8
1960 FOR=1:ELSE IFP(4+G8+G8+G8
1970 FOR=1:ELSE IFP(4+G8+G8+G8
1980 FOR=1:ELSE IFP(4+G8+G8+G8
1990 FOR=1:ELSE IFP(4+G8+G8+G8
2000 FOR=1:ELSE IFP(4+G8+G8+G8

```







```

3130 NEXT
3140 IF (L=0) THEN L=1:GOTO 3137
3150
3160 LOOP UNTIL L=0:GOTO 3130-TP-1
3170 IF L=0 THEN L=1:GOTO 3130-TP-1
3180
3190 IF L=1 THEN L=2:GOTO 3130-TP-1
3200
3210 IF L=2 THEN L=3:GOTO 3130-TP-1
3220
3230 IF L=3 THEN L=4:GOTO 3130-TP-1
3240
3250 IF L=4 THEN L=5:GOTO 3130-TP-1
3260
3270 IF L=5 THEN L=6:GOTO 3130-TP-1
3280
3290 IF L=6 THEN L=7:GOTO 3130-TP-1
3300
3310 IF L=7 THEN L=8:GOTO 3130-TP-1
3320
3330 IF L=8 THEN L=9:GOTO 3130-TP-1
3340
3350 IF L=9 THEN L=10:GOTO 3130-TP-1
3360
3370 IF L=10 THEN L=11:GOTO 3130-TP-1
3380
3390 IF L=11 THEN L=12:GOTO 3130-TP-1
3400
3410 IF L=12 THEN L=13:GOTO 3130-TP-1
3420
3430 IF L=13 THEN L=14:GOTO 3130-TP-1
3440
3450 IF L=14 THEN L=15:GOTO 3130-TP-1
3460
3470 IF L=15 THEN L=16:GOTO 3130-TP-1
3480
3490 IF L=16 THEN L=17:GOTO 3130-TP-1
3500
3510 IF L=17 THEN L=18:GOTO 3130-TP-1
3520
3530 IF L=18 THEN L=19:GOTO 3130-TP-1
3540
3550 IF L=19 THEN L=20:GOTO 3130-TP-1
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3570 IF L=20 THEN L=21:GOTO 3130-TP-1
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3590 IF L=21 THEN L=22:GOTO 3130-TP-1
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3610 IF L=22 THEN L=23:GOTO 3130-TP-1
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3630 IF L=23 THEN L=24:GOTO 3130-TP-1
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3650 IF L=24 THEN L=25:GOTO 3130-TP-1
3660
3670 IF L=25 THEN L=26:GOTO 3130-TP-1
3680
3690 IF L=26 THEN L=27:GOTO 3130-TP-1
3700
3710 IF L=27 THEN L=28:GOTO 3130-TP-1
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3730 IF L=28 THEN L=29:GOTO 3130-TP-1
3740
3750 IF L=29 THEN L=30:GOTO 3130-TP-1
3760
3770 IF L=30 THEN L=31:GOTO 3130-TP-1
3780
3790 IF L=31 THEN L=32:GOTO 3130-TP-1
3800
3810 IF L=32 THEN L=33:GOTO 3130-TP-1
3820
3830 IF L=33 THEN L=34:GOTO 3130-TP-1
3840
3850 IF L=34 THEN L=35:GOTO 3130-TP-1
3860
3870 IF L=35 THEN L=36:GOTO 3130-TP-1
3880
3890 IF L=36 THEN L=37:GOTO 3130-TP-1
3900
3910 IF L=37 THEN L=38:GOTO 3130-TP-1
3920
3930 IF L=38 THEN L=39:GOTO 3130-TP-1
3940
3950 IF L=39 THEN L=40:GOTO 3130-TP-1
3960
3970 IF L=40 THEN L=41:GOTO 3130-TP-1
3980
3990 IF L=41 THEN L=42:GOTO 3130-TP-1
4000
4010 IF L=42 THEN L=43:GOTO 3130-TP-1
4020
4030 IF L=43 THEN L=44:GOTO 3130-TP-1
4040
4050 IF L=44 THEN L=45:GOTO 3130-TP-1
4060
4070 IF L=45 THEN L=46:GOTO 3130-TP-1
4080
4090 IF L=46 THEN L=47:GOTO 3130-TP-1
4100
4110 IF L=47 THEN L=48:GOTO 3130-TP-1
4120
4130 IF L=48 THEN L=49:GOTO 3130-TP-1
4140
4150 IF L=49 THEN L=50:GOTO 3130-TP-1
4160
4170 IF L=50 THEN L=51:GOTO 3130-TP-1
4180
4190 IF L=51 THEN L=52:GOTO 3130-TP-1
4200
4210 IF L=52 THEN L=53:GOTO 3130-TP-1
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4230 IF L=53 THEN L=54:GOTO 3130-TP-1
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4250 IF L=54 THEN L=55:GOTO 3130-TP-1
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4270 IF L=55 THEN L=56:GOTO 3130-TP-1
4280
4290 IF L=56 THEN L=57:GOTO 3130-TP-1
4300
4310 IF L=57 THEN L=58:GOTO 3130-TP-1
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4330 IF L=58 THEN L=59:GOTO 3130-TP-1
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4350 IF L=59 THEN L=60:GOTO 3130-TP-1
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4370 IF L=60 THEN L=61:GOTO 3130-TP-1
4380
4390 IF L=61 THEN L=62:GOTO 3130-TP-1
4400
4410 IF L=62 THEN L=63:GOTO 3130-TP-1
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4430 IF L=63 THEN L=64:GOTO 3130-TP-1
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4450 IF L=64 THEN L=65:GOTO 3130-TP-1
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4470 IF L=65 THEN L=66:GOTO 3130-TP-1
4480
4490 IF L=66 THEN L=67:GOTO 3130-TP-1
4500
4510 IF L=67 THEN L=68:GOTO 3130-TP-1
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4530 IF L=68 THEN L=69:GOTO 3130-TP-1
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4550 IF L=69 THEN L=70:GOTO 3130-TP-1
4560
4570 IF L=70 THEN L=71:GOTO 3130-TP-1
4580
4590 IF L=71 THEN L=72:GOTO 3130-TP-1
4600
4610 IF L=72 THEN L=73:GOTO 3130-TP-1
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4630 IF L=73 THEN L=74:GOTO 3130-TP-1
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4650 IF L=74 THEN L=75:GOTO 3130-TP-1
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4670 IF L=75 THEN L=76:GOTO 3130-TP-1
4680
4690 IF L=76 THEN L=77:GOTO 3130-TP-1
4700
4710 IF L=77 THEN L=78:GOTO 3130-TP-1
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4730 IF L=78 THEN L=79:GOTO 3130-TP-1
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4750 IF L=79 THEN L=80:GOTO 3130-TP-1
4760
4770 IF L=80 THEN L=81:GOTO 3130-TP-1
4780
4790 IF L=81 THEN L=82:GOTO 3130-TP-1
4800
4810 IF L=82 THEN L=83:GOTO 3130-TP-1
4820
4830 IF L=83 THEN L=84:GOTO 3130-TP-1
4840
4850 IF L=84 THEN L=85:GOTO 3130-TP-1
4860
4870 IF L=85 THEN L=86:GOTO 3130-TP-1
4880
4890 IF L=86 THEN L=87:GOTO 3130-TP-1
4900
4910 IF L=87 THEN L=88:GOTO 3130-TP-1
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4930 IF L=88 THEN L=89:GOTO 3130-TP-1
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4950 IF L=89 THEN L=90:GOTO 3130-TP-1
4960
4970 IF L=90 THEN L=91:GOTO 3130-TP-1
4980
4990 IF L=91 THEN L=92:GOTO 3130-TP-1
5000
5010 IF L=92 THEN L=93:GOTO 3130-TP-1
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5030 IF L=93 THEN L=94:GOTO 3130-TP-1
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5050 IF L=94 THEN L=95:GOTO 3130-TP-1
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5070 IF L=95 THEN L=96:GOTO 3130-TP-1
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5090 IF L=96 THEN L=97:GOTO 3130-TP-1
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5110 IF L=97 THEN L=98:GOTO 3130-TP-1
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5130 IF L=98 THEN L=99:GOTO 3130-TP-1
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5150 IF L=99 THEN L=100:GOTO 3130-TP-1
5160
5170 IF L=100 THEN L=101:GOTO 3130-TP-1
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5190 IF L=101 THEN L=102:GOTO 3130-TP-1
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5210 IF L=102 THEN L=103:GOTO 3130-TP-1
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5230 IF L=103 THEN L=104:GOTO 3130-TP-1
5240
5250 IF L=104 THEN L=105:GOTO 3130-TP-1
5260
5270 IF L=105 THEN L=106:GOTO 3130-TP-1
5280
5290 IF L=106 THEN L=107:GOTO 3130-TP-1
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5310 IF L=107 THEN L=108:GOTO 3130-TP-1
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5330 IF L=108 THEN L=109:GOTO 3130-TP-1
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5350 IF L=109 THEN L=110:GOTO 3130-TP-1
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5370 IF L=110 THEN L=111:GOTO 3130-TP-1
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5390 IF L=111 THEN L=112:GOTO 3130-TP-1
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5410 IF L=112 THEN L=113:GOTO 3130-TP-1
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5430 IF L=113 THEN L=114:GOTO 3130-TP-1
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5470 IF L=115 THEN L=116:GOTO 3130-TP-1
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5570 IF L=120 THEN L=121:GOTO 3130-TP-1
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5590 IF L=121 THEN L=122:GOTO 3130-TP-1
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5650 IF L=124 THEN L=125:GOTO 3130-TP-1
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5670 IF L=125 THEN L=126:GOTO 3130-TP-1
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5690 IF L=126 THEN L=127:GOTO 3130-TP-1
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5710 IF L=127 THEN L=128:GOTO 3130-TP-1
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5730 IF L=128 THEN L=129:GOTO 3130-TP-1
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5750 IF L=129 THEN L=130:GOTO 3130-TP-1
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5770 IF L=130 THEN L=131:GOTO 3130-TP-1
5780
5790 IF L=131 THEN L=132:GOTO 3130-TP-1
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5810 IF L=132 THEN L=133:GOTO 3130-TP-1
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5830 IF L=133 THEN L=134:GOTO 3130-TP-1
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5850 IF L=134 THEN L=135:GOTO 3130-TP-1
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5870 IF L=135 THEN L=136:GOTO 3130-TP-1
5880
5890 IF L=136 THEN L=137:GOTO 3130-TP-1
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5910 IF L=137 THEN L=138:GOTO 3130-TP-1
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5930 IF L=138 THEN L=139:GOTO 3130-TP-1
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5950 IF L=139 THEN L=140:GOTO 3130-TP-1
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5970 IF L=140 THEN L=141:GOTO 3130-TP-1
5980
5990 IF L=141 THEN L=142:GOTO 3130-TP-1
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6010 IF L=142 THEN L=143:GOTO 3130-TP-1
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6030 IF L=143 THEN L=144:GOTO 3130-TP-1
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6050 IF L=144 THEN L=145:GOTO 3130-TP-1
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6070 IF L=145 THEN L=146:GOTO 3130-TP-1
6080
6090 IF L=146 THEN L=147:GOTO 3130-TP-1
6100
6110 IF L=147 THEN L=148:GOTO 3130-TP-1
6120
6130 IF L=148 THEN L=149:GOTO 3130-TP-1
6140
6150 IF L=149 THEN L=150:GOTO 3130-TP-1
6160
6170 IF L=150 THEN L=151:GOTO 3130-TP-1
6180
6190 IF L=151 THEN L=152:GOTO 3130-TP-1
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6210 IF L=152 THEN L=153:GOTO 3130-TP-1
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6230 IF L=153 THEN L=154:GOTO 3130-TP-1
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6250 IF L=154 THEN L=155:GOTO 3130-TP-1
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6270 IF L=155 THEN L=156:GOTO 3130-TP-1
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6290 IF L=156 THEN L=157:GOTO 3130-TP-1
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6310 IF L=157 THEN L=158:GOTO 3130-TP-1
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6330 IF L=158 THEN L=159:GOTO 3130-TP-1
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6350 IF L=159 THEN L=160:GOTO 3130-TP-1
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6370 IF L=160 THEN L=161:GOTO 3130-TP-1
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6390 IF L=161 THEN L=162:GOTO 3130-TP-1
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6410 IF L=162 THEN L=163:GOTO 3130-TP-1
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6430 IF L=163 THEN L=164:GOTO 3130-TP-1
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6450 IF L=164 THEN L=165:GOTO 3130-TP-1
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6470 IF L=165 THEN L=166:GOTO 3130-TP-1
6480
6490 IF L=166 THEN L=167:GOTO 3130-TP-1
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6510 IF L=167 THEN L=168:GOTO 3130-TP-1
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6530 IF L=168 THEN L=169:GOTO 3130-TP-1
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6550 IF L=169 THEN L=170:GOTO 3130-TP-1
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6570 IF L=170 THEN L=171:GOTO 3130-TP-1
6580
6590 IF L=171 THEN L=172:GOTO 3130-TP-1
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6610 IF L=172 THEN L=173:GOTO 3130-TP-1
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6630 IF L=173 THEN L=174:GOTO 3130-TP-1
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6650 IF L=174 THEN L=175:GOTO 3130-TP-1
6660
6670 IF L=175 THEN L=176:GOTO 3130-TP-1
6680
6690 IF L=176 THEN L=177:GOTO 3130-TP-1
6700
6710 IF L=177 THEN L=178:GOTO 3130-TP-1
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6730 IF L=178 THEN L=179:GOTO 3130-TP-1
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6750 IF L=179 THEN L=180:GOTO 3130-TP-1
6760
6770 IF L=180 THEN L=181:GOTO 3130-TP-1
6780
6790 IF L=181 THEN L=182:GOTO 3130-TP-1
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6810 IF L=182 THEN L=183:GOTO 3130-TP-1
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6830 IF L=183 THEN L=184:GOTO 3130-TP-1
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6850 IF L=184 THEN L=185:GOTO 3130-TP-1
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6870 IF L=185 THEN L=186:GOTO 3130-TP-1
6880
6890 IF L=186 THEN L=187:GOTO 3130-TP-1
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6910 IF L=187 THEN L=188:GOTO 3130-TP-1
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6930 IF L=188 THEN L=189:GOTO 3130-TP-1
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6950 IF L=189 THEN L=190:GOTO 3130-TP-1
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6970 IF L=190 THEN L=191:GOTO 3130-TP-1
6980
6990 IF L=191 THEN L=192:GOTO 3130-TP-1
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7010 IF L=192 THEN L=193:GOTO 3130-TP-1
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7030 IF L=193 THEN L=194:GOTO 3130-TP-1
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7050 IF L=194 THEN L=195:GOTO 3130-TP-1
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7070 IF L=195 THEN L=196:GOTO 3130-TP-1
7080
7090 IF L=196 THEN L=197:GOTO 3130-TP-1
7100
7110 IF L=197 THEN L=198:GOTO 3130-TP-1
7120
7130 IF L=198 THEN L=199:GOTO 3130-TP-1
7140
7150 IF L=199 THEN L=200:GOTO 3130-TP-1
7160
7170 IF L=200 THEN L=201:GOTO 3130-TP-1
7180
7190 IF L=201 THEN L=202:GOTO 3130-TP-1
7200
7210 IF L=202 THEN L=203:GOTO 3130-TP-1
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7230 IF L=203 THEN L=204:GOTO 3130-TP-1
7240
7250 IF L=204 THEN L=205:GOTO 3130-TP-1
7260
7270 IF L=205 THEN L=206:GOTO 3130-TP-1
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7290 IF L=206 THEN L=207:GOTO 3130-TP-1
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7310 IF L=207 THEN L=208:GOTO 3130-TP-1
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7330 IF L=208 THEN L=209:GOTO 3130-TP-1
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7350 IF L=209 THEN L=210:GOTO 3130-TP-1
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7370 IF L=210 THEN L=211:GOTO 3130-TP-1
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7390 IF L=211 THEN L=212:GOTO 3130-TP-1
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7410 IF L=212 THEN L=213:GOTO 3130-TP-1
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7430 IF L=213 THEN L=214:GOTO 3130-TP-1
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7450 IF L=214 THEN L=215:GOTO 3130-TP-1
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7470 IF L=215 THEN L=216:GOTO 3130-TP-1
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7490 IF L=216 THEN L=217:GOTO 3130-TP-1
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7510 IF L=217 THEN L=218:GOTO 3130-TP-1
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7530 IF L=218 THEN L=219:GOTO 3130-TP-1
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7550 IF L=219 THEN L=220:GOTO 3130-TP-1
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7570 IF L=220 THEN L=221:GOTO 3130-TP-1
7580
7590 IF L=221 THEN L=222:GOTO 3130-TP-1
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7610 IF L=222 THEN L=223:GOTO 3130-TP-1
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7630 IF L=223 THEN L=224:GOTO 3130-TP-1
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7650 IF L=224 THEN L=225:GOTO 3130-TP-1
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7670 IF L=225 THEN L=226:GOTO 3130-TP-1
7680
7690 IF L=226 THEN L=227:GOTO 3130-TP-1
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7710 IF L=227 THEN L=228:GOTO 3130-TP-1
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7730 IF L=228 THEN L=229:GOTO 3130-TP-1
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7750 IF L=229 THEN L=230:GOTO 3130-TP-1
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7770 IF L=230 THEN L=231:GOTO 3130-TP-1
7780
7790 IF L=231 THEN L=232:GOTO 3130-TP-1
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7810 IF L=232 THEN L=233:GOTO 3130-TP-1
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7830 IF L=233 THEN L=234:GOTO 3130-TP-1
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7850 IF L=234 THEN L=235:GOTO 3130-TP-1
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7870 IF L=235 THEN L=236:GOTO 3130-TP-1
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7890 IF L=236 THEN L=237:GOTO 3130-TP-1
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7910 IF L=237 THEN L=238:GOTO 3130-TP-1
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7930 IF L=238 THEN L=239:GOTO 3130-TP-1
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7950 IF L=239 THEN L=240:GOTO 3130-TP-1
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7970 IF L=240 THEN L=241:GOTO 3130-TP-1
7980
7990 IF L=241 THEN L=242:GOTO 3130-TP-1
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8010 IF L=242 THEN L=243:GOTO 3130-TP-1
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8030 IF L=243 THEN L=244:GOTO 3130-TP-1
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8050 IF L=244 THEN L=245:GOTO 3130-TP-1
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8070 IF L=245 THEN L=246:GOTO 3130-TP-1
8080
8090 IF L=246 THEN L=247:GOTO 3130-TP-1
8100
8110 IF L=247 THEN L=248:GOTO 3130-TP-1
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8130 IF L=248 THEN L=249:GOTO 3130-TP-1
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8150 IF L=249 THEN L=250:GOTO 3130-TP-1
8160
8170 IF L=250 THEN L=251:GOTO 3130-TP-1
8180
8190 IF L=251 THEN L=252:GOTO 3130-TP-1
8200
8210 IF L=252 THEN L=253:GOTO 3130-TP-1
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8230 IF L=253 THEN L=254:GOTO 3130-TP-1
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8250 IF L=254 THEN L=255:GOTO 3130-TP-1
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8270 IF L=255 THEN L=256:GOTO 3130-TP-1
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8290 IF L=256 THEN L=257:GOTO 3130-TP-1
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8310 IF L=257 THEN L=258:GOTO 3130-TP-1
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8330 IF L=258 THEN L=259:GOTO 3130-TP-1
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8350 IF L=259 THEN L=260:GOTO 3130-TP-1
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8370 IF L=260 THEN L=261:GOTO 3130-TP-1
8380
8390 IF L=261 THEN L=262:GOTO 3130-TP-1
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8410 IF L=262 THEN L=263:GOTO 3130-TP-1
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8430 IF L=263 THEN L=264:GOTO 3130-TP-1
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8450 IF L=264 THEN L=265:GOTO 3130-TP-1
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8470 IF L=265 THEN L=266:GOTO 3130-TP-1
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8490 IF L=266 THEN L=267:GOTO 3130-TP-1
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8510 IF L=267 THEN L=268:GOTO 3130-TP-1
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8530 IF L=268 THEN L=269:GOTO 3130-TP-1
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8550 IF L=269 THEN L=270:GOTO 3130-TP-1
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8570 IF L=270 THEN L=271:GOTO 3130-TP-1
8580
8590 IF L=271 THEN L=272:GOTO 3130-TP-1
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8610 IF L=272 THEN L=273:GOTO 3130-TP-1
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8630 IF L=273 THEN L=274:GOTO 3130-TP-1
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8650 IF L=274 THEN L=275:GOTO 3130-TP-1
8660
8670 IF L=275 THEN L=276:GOTO 3130-TP-1
8680
8690 IF L=276 THEN L=277:GOTO 3130-TP-1
8700
8710 IF L=277 THEN L=278:GOTO 3130-TP-1
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8730 IF L=278 THEN L=279:GOTO 3130-TP-1
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8750 IF L=279 THEN L=280:GOTO 3130-TP-1
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8770 IF L=280 THEN L=281:GOTO 3130-TP-1
8780
8790 IF L=281 THEN L=282:GOTO 3130-TP-1
8800
8810 IF L=282 THEN L=283:GOTO 3130-TP-1
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8830 IF L=283 THEN L=284:GOTO 3130-TP-1
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8850 IF L=284 THEN L=285:GOTO 3130-TP-1
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8870 IF L=285 THEN L=286:GOTO 3130-TP-1
8880
8890 IF L=286 THEN L=287:GOTO 3130-TP-1
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8910 IF L=287 THEN L=288:GOTO 3130-TP-1
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8930 IF L=288 THEN L=289:GOTO 3130-TP-1
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8950 IF L=289 THEN L=290:GOTO 3130-TP-1
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8970 IF L=290 THEN L=291:GOTO 3130-TP-1
8980
8990 IF L=291 THEN L=292:GOTO 3130-TP-1
9000
9010 IF L=292 THEN L=293:GOTO 3130-TP-1
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9030 IF L=293 THEN L=294:GOTO 3130-TP-1
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9050 IF L=294 THEN L=295:GOTO 3130-TP-1
9060
9070 IF L=295 THEN L=296:GOTO 3130-TP-1
9080
9090 IF L=296 THEN L=297:GOTO 3130-TP-1
9100
9110 IF L=297 THEN L=298:GOTO 3130-TP-1
9120
9130 IF L=298 THEN L=299:GOTO 3130-TP-1
9140
9150 IF L=299 THEN L=300:GOTO 3130-TP-1
9160
9170 IF L=300 THEN L=301:GOTO 3130-TP-1
9180
9190 IF L=301 THEN L=302:GOTO 3130-TP-1
9200
9210 IF L=302 THEN L=303:GOTO 3130-TP-1
9220
9230 IF L=303 THEN L=304:GOTO 3130-TP-1
9240
9250 IF L=304 THEN L=305:GOTO 3130-TP-1
9260
9270 IF L=305 THEN L=306:GOTO 3130-TP-1
9280
9290 IF L=306 THEN L=307:GOTO 3130-TP-1
9300
9310 IF L=307 THEN L=308:GOTO 3130-TP-1
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9330 IF L=308 THEN L=309:GOTO 3130-TP-1
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9350 IF L=309 THEN L=310:GOTO 3130-TP-1
9360
9370 IF L=310 THEN L=311:GOTO 3130-TP-1
9380
9390 IF L=311 THEN L=312:GOTO 3130-TP-1
9400
9410 IF L=312 THEN L=313:GOTO 3130-TP-1
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9430 IF L=313 THEN L=314:GOTO 3130-TP-1
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9450 IF L=314 THEN L=315:GOTO 3130-TP-1
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9470 IF L=315 THEN L=316:GOTO 3130-TP-1
9480
9490 IF L=316 THEN L=317:GOTO 3130-TP-1
9500
9510 IF L=317 THEN L=318:GOTO 3130-TP-1
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9530 IF L=318 THEN L=319:GOTO 3130-TP-1
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9550 IF L=319 THEN L=320:GOTO 3130-TP-1
9560
9570 IF L=320 THEN L=321:GOTO 3130-TP-1
9580
9590 IF L=321 THEN L=322:GOTO 3130-TP-1
9600
9610 IF L=322 THEN L=323:GOTO 3130-TP-1
9620
9630 IF L=323 THEN L=324:GOTO 3130-TP-1
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9650 IF L=324 THEN L=325:GOTO 3130-TP-1
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9670 IF L=325 THEN L=326:GOTO 3130-TP-1
9680
9690 IF L=326 THEN L=327:GOTO 3130-TP-1
9700
9710 IF L=327 THEN L=328:GOTO 3130-TP-1
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9730 IF L=328 THEN L=329:GOTO 3130-TP-1
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9750 IF L=329 THEN L=330:GOTO 3130-TP-1
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9770 IF L=330 THEN L=331:GOTO 3130-TP-1
9780
9790 IF L=331 THEN L=332:GOTO 3130-TP-1
9800
9810 IF L=332 THEN L=333:GOTO 3130-TP-1
9820
9830 IF L=333 THEN L=334:GOTO 3130-TP-1
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9850 IF L=334 THEN L=335:GOTO 3130-TP-1
9860
9870 IF L=335 THEN L=336:GOTO 3130-TP-1
9880
9890 IF L=336 THEN L=337:GOTO 3130-TP-1
9900
9910 IF L=337 THEN L=338:GOTO 3130-TP-1
9920
9930 IF L=338 THEN L=339:GOTO 3130-TP-1
9940
9950 IF L=339 THEN L=340:GOTO 3130-TP-1
9960
9970 IF L=340 THEN L=341:GOTO 3130-TP-1
9980
9990 IF L=341 THEN L=342:GOTO 3130-TP-1

```









# Diskit 4

*To continue our special series for disk users, we bring you a routine which will foil those would be hackers from stealing your thunder.*

*By Les Allen*

**H**ow often have you written a useful utility as program routine, given it a "friend" only to discover at a later time that somebody else has "gone in" and taken the credits. Annoying isn't it?

Also there are a certain number of users that take delight in corrupting software by changing the text routines etc.

This program routine provides the user with the facility to scramble code thus making the would be hacker's job that much more difficult as the scrambled code disguises any text.

## Getting It In

Make sure that sufficient room exists on the disk prior to "booting" up "PROG.SCRAMBLER". occasionally one extra disk block is used on the second file. Press any key on the keyboard to enter the scramble code, enter the filename of the program to be scrambled and press RETURN to start the operation.

The program is then loaded, scrambled and saved back to disk as "FILENAME" where filename is the name of the program.

The routine adds 70 bytes to the saved code as the only limitation on this routine is that the original program must exist between \$0001 and \$C7FF. Then if 262 blocks are used there still may be sufficient room on

the disk. As I am sure you are aware, each block is allocated 256 bytes but all may not be used.

Once the save process is completed the program exists in memory as the finished product and can be confirmed as successful by entering RUN.

The program must be typed in

exactly as listed and saved prior to running. Error trap routines are included to ensure that the data as read is correct. The program, when run, stores the relevant code at a temporary address of \$0001 and when prompted collects the working programs to Basic (\$0001) and saves the program to disk.

## PROGRAM - SCRAMBLER CODE

```

00 10 01=SCRAMBLER CODE
01 01 PRINT "ENTER CODE TO SCRAMBLE"
02 02 FORN=1 TO 256:FORM=1 TO 256:FORM=FORM+1
03 03 PRINT "ENTER CODE TO SCRAMBLE"
04 04 PRINT
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Join-depth self-tutoring for the Commodore 64 on a two-sided disk. This more-driven tutorial covers every aspect of your C-64 BASIC: keywords, words, means, syntax and other conventions.



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# C16 Games

*Specially for our C16/Plus/4 readers, we bring you a selection of the latest entertainment software for your computer.*

*By Paul Eves*

## DIAMOND MINE

**D**iamond Mine is one of those games that is difficult to get to grips with at the start, but for some reason you have to keep having 'just one more go'.

The idea is to guide your pipe through the mine to reach the diamonds. You have to avoid contact with the walls and bags, otherwise you lose that much pipe and you have to start all over again. On each level, the length of pipe you have to start with gets less and less, this is shown at the top left of the screen.

Movement of the pipe is one of those infuriating types of control. Once you start to move, you cannot stop. Therefore you not only have to be accurate, you must also have quick reflexes.

Although this looks a very simple game, there is quite a lot of hidden strategy involved in actual play. Pick the shortest route to a diamond, not the easiest, for example.



Although the graphics are simple, most of the screen is comprised of wall, I quite liked them. Overall, a difficult game to master but well worth the effort.

### TouchAlive

**Title:** Diamond Mine. **Company:** Blue Ribbon Software Ltd. **CDS House, Bakers Road, Doncaster, South Yorks. Price:** £1.99.

**Originality:** 7/10. **Playability:** 7/10. **Graphics:** 7/10. **Value:** 8/10.

## MAGICIANS CURSE

**G**ordin Graphics has produced one of the better games for the C16/Plus/4 for some time, with Magicians Curse. 'Long ago, this land was inhabited by an evil magician. The land is now uninhabited etc.', so the story informs you. It's surprising how many evil magicians used to exist.

The prime object is to search this land of 48 screens and secure for yourself a golden statue. Before you achieve this goal however, you must also collect seven talismans. These can be found in various places just lying around.

While you are busy running from screen to screen, your money is quite understandably getting less and less. To counteract this, you need to either drink some potion, or eat some food. A couple of the locations will need a key to gain entry, while the underground screens will need some light source to navigate.

Naturally, it is not quite this simple. There are the odd vampire bats lurking around, and falling apples to dodge. In

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curse which poisons you eat, one of them is poisoned (find the antidote quick).

Considering the limitations in programming the C64, this is quite a good game. I especially liked the animation of the bats, no flicker to be seen anywhere. Also the stars twinkling in the night sky is pleasing. Well done Greenin'.

#### Touchline

**Title:** *Witchin' Curse*. **Company:** Gemini Graphics. **Alpha House 30 Carver Street, Sheffield, S1 4PS. Price:** £6.95. **Originality:** 4/10. **Playability:** 4/10. **Graphics:** 7/10. **Value:** 5/10.

#### DIAMOND MINE II

**H**aving completed *Diamond Mine*, you have now mined all your new found wealth into opening an even bigger mine. *Diamond Mine II* is virtually the as its predecessor except that there are a couple of variations.

In this version you have an assistant that keep your work motor going. This time you can suck the rocks up into your pipe, however after a time they will re-appear, so watch out.

If you try to cross over your path, or go back the same way, a life is lost. You can however retract your pipe by pressing the return key. This feature of the game makes it a lot better to play than the original. You now have the ability to plan your tactics a lot better. Allow the 10th level the mine become 'irrevable', making your take that much harder.

#### Touchline

**Title:** *Diamond Mine II*. **Company:** Alex Ribbon Software Ltd. **CDS House, Bicknell Road, Doncaster, South Yorks. Price:** £10.95. **Originality:** 5/10. **Playability:** 8/10. **Graphics:** 7/10. **Value:** 7/10.

#### PINPOINT

**F**or those of you that have seen *Marble Madness*, *Pinpoint* will hold no mystery. The concept is the same. You have to reach the white flag with your spinning top. Having achieved this, you go on to the next level.

Amiga has here produced a game that should be very popular. I say should be, but I have my reservations. The main problem, is that the game is just too difficult to play and enjoy fully. Control of the top is via the joystick, and you need to be very precise in your movements.

There are the usual steep slopes to climb, and chasms to leap. The downward slopes need to be tackled very slowly otherwise you lose your top off the edge. Understandably, sound is somewhat lacking, and I find you will soon tire of the 'da, da's' everytime you lose a top.

The play card informs you that there are 10 levels of difficulty, but I must confess to only reaching the fourth one before abandoning the play. The graphics are fairly good, being the two colour variety.

Lovers of *Marble Madness* and *Spinztery* will obviously love this one, as for the rest of you, I have doubts.

#### Touchline

**Title:** *Pinpoint*. **Supplier:** Amiga Software, 4 Westgate House, Spital Street, Darford, Kent. **Price:** £3.95. **Originality:** 3/10. **Playability:** 4/10. **Graphics:** 5/10. **Value:** 6/10.



#### SPIKY HAROLD

**F**orbid has come up with some real winners in the past, but I don't think that *Spiky Harold* will be one of them. It's a nice enough game, but I think it lacks that inexplicable quality of 'wonderfulness'.

The idea is that you have to help Harold collect as much grub as possible, to help him hibernate for the winter. The grub in question consists mainly of apples, grapes, pineapples, (What so nuts?) and wine. (Beware not too much).





You have to visit various rooms to collect the said grub, each is filled with nasties of varying types. All the nasties have one thing in common, that is, they kill you on contact. This isn't too big a problem seeing as you start off with 19 lives.

The animation of the nasties is done very well. My only gripe is the 'Character Delete' routine. It takes some time before you can really judge safe distances.

In your wanderings you will, from time to time, come across a coin. Picking this up will give you one extra life. Just one point, the watchman has predicted a severe frost in the next 24 hours. This would obviously tell our Harold, so you must succeed in your task before the time runs out.

Spiky Harold, is basically a platform game, which we either love or hate. Overall not a bad attempt.

#### Touchline

**Title:** Spiky Harold. **Company:** Firebird. **3d New Oxford Street, London WC1A 1PS. Price:** £1.95.

**Originality:** 4/10. **Playability:** 5/10. **Graphics:** 6/10. **Value:** 7/10.

#### DANGERZONE

**T**here is no escaping the fact that some people enjoy the idea of blasting anything that moves. It must be an inbuilt desire that humans suffer from. Dangerousness lets you do just that.

As test pilot for the XT-99 Fighter some reconnaissance ship, you have to blast your way through 20 levels of asteroid belts. The higher the level, the faster they come at you. There are also the odd wave of alien craft to blast as well, so you need to keep your mind on your flying or else.

The scrolling is definitely smooth, and on the higher levels fast as well. My only real criticism, is that you can only move in one of two directions (up or down).

Your ship is equipped with rapid fire lasers. However constant use of this facility soon depletes your weaponry, so use this with caution.

Flying without firing will increase your fire-power but

watch out. The action is fast and furious, but I feel that a couple of hours play is more than enough of this one.

#### Touchline

**Title:** Dangerous. **Company:** Cadamaster. **1 Brunton Business Centre, Brunton Close, Basingstoke GU24 0BT.**

**Originality:** 3/10. **Playability:** 4/10. **Graphics:** 6/10. **Value:** 5/10.

#### ASTRO PLUMBER

**Y**ou can be forgiven for thinking that you have seen this game before. The truth is, you have. It was this one better a Super Pipeline and Super Pipeline II by Taskan on the 68.

I am not putting this down though. It's a very good clone. You are the maintenance man just arrived from Earth. Your job is to repair the leaking air pipes that serve Colony II on the moon. (The underground caverns are inhabited by the usual nasties that have to be avoided. To aid you in this task you are wearing a jet pack, which I couldn't quite master.

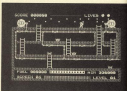
You use your Plasma laser to repair the pipes. But excessive use drains your supply, so use with caution. You can leave a screen without completing all repairs, but when you return to that screen, the leaks have re-appeared.

You can use the air tanks on the surface of the moon to replenish your supply, but unfortunately you cannot use the jet pack while on the surface. When the pressure indicator for the level you are on shows flat, you will be awarded a bonus score, and you then progress to the next round. ☺

#### Touchline

**Title:** Astro Plumber. **Company:** Blue Ribbon Software Ltd. **CDI House, Beckers Road, Doncaster, South Yorks. Price:** £1.95.

**Originality:** 3/10. **Playability:** 3/10. **Graphics:** 5/10. **Value:** 3/10.





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*Disk users take heart. Here we provide a handy disk routine to convert memory to data statements.*

There are occasions when it is desirable to convert a section of memory from machine code to a Basic program containing a routine (and set of data instructions) that represent the original machine's memory.

This program provides the user with the facility to "read" sections of machine memory to do just that! In fact the Basic loader for this program was produced from the very same loader!

Start and end addresses are converted to cover the range of memory to be converted. These are POKE'd into the machine code routine resident at 8000 which re-locates the Basic loader and performs the operation of "reading" each byte to provide two-digit hex number in the data statement row.

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This process is repeated for every byte within the range as previously specified. The completed data listing is then saved to disk as DATA and should be re-loaded prior to running to establish start of variables which begins at the end of the Basic loader.

The SYS address contained in the Base loader is the warm start address and should be modified to that required by the nature of the area of memory being executed.

The program must be typed in exactly as listed and saved prior to running. Error trap routines are included to ensure that the data entered is correct. The program, when run, stores the relevant code at a temporary address of 8000 and when prompted relocates the working program to Base (8000) and sends to the program to disk.

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# Split Sprite

*Many programmers find that sprite manipulation can be hard work. Perhaps this program will make things a little easier.*

*By S.J. Chance*

**W**hile developing a machine code program recently, after the initial paperwork I thought it might be constructive to do a 'rough sketch' of it in Basic. Sure it might be, but it's a good way to flush out a few errors in logic and structure, which might otherwise only be uncovered after hours wasted producing redundant code.

I immediately ran into a problem. I intended to use more than eight hardware sprites in the program, and of course it is quite impossible to write a master-interrupt routine in Basic. For the sake of thoroughness, I shall explain the nature of master interrupts for the uninformed.

The image on your monitor screen is drawn by an electron beam sweeping across the screen in a series of horizontal lines, each line starting just below the previous one. This pattern of lines is called a raster.

Now as all know, the VIC chip in a bit supports eight hardware sprites. However, if you put your sprites at the top of the screen, and then use a raster interrupt to find out when the raster has travelled far enough down the screen to have drawn these sprites, you

can then reposition them further down the screen so that when the raster gets to their new location, it draws them all over again. And when you reposition the sprites you can also change their colour and definition.

I decided to write a routine which would make master-interrupt sprites available from Basic. This was quite easy to do, but created a new problem. I had written on a screen format of five rows, (see Fig. 1) which meant that my routine was being called 256 times per second. With all that going on, Basic was running at about 1/4 of its normal speed. With potentially 48 sprites to manipulate in addition to whatever else it was doing, it became clear that Basic would need helping out.

I extended Basic with a set of extra commands to set sprite parameters and move them around. Although this slowed down the interpreter even more, the new commands were more efficient and therefore resulted in a net increase in speed. These commands are listed in Figure 2, and I will say more about them later.

Returning to Figure 1, you will see that it shows the screen divided into zones 0 to 4, and link spaces 0 to 3. The

zones are the areas in which the top edge of an unexpanded sprite can be positioned such that the sprite is clear of the master-interrupt divisions above and below it.

If a sprite is positioned in link space, part of it will be across the master-interrupt line and will be drawn with the sprite parameters for the adjacent zone. To prevent the sprite from looking as if it has been torn in half, it must be 'linked' to the equivalent sprite in the next zone, so that sprite moves share the same parameters. If that all sounds a bit of a headache, it will become clearer later on.

## Understanding the Commands

Looking again at Figure 2, all the commands are prefixed by the  $\pi$  symbol. This is not intended as a source of inspiration, but rather to divert handling of the commands away from the normal interpreter. You will see that many of the commands use the syntax:

[zone][sprite]



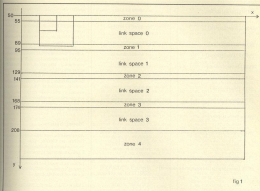


Fig 1

when zone=0 to 4 and sprite=0 to 7. From now on I shall refer to a specific sprite by these parameters e.g. sprite 3 is sprite number 3 in zone 3.

Having said that, the Basic commander supports a far easier way of specifying a sprite. Consider the command `TYPE` in Figure 2. When positioning a sprite with this command, it is important that the y-co-ordinate falls within the specified zone. This is easy enough to do using Figure 1, but there is an alternative option. This is to assign an integer array closer to the sprite, replacing [zone], [sprite] in the syntax. For instance, suppose I give the command

`TYPE 2,6,130`

positioning sprite 6 in zone 2 at y=130. This is correct as y=130 falls within zone 2. However, if I give the command

`TYPE C%6,130`

the sprite will be positioned exactly as

before, and the correct zone number will be written into `C%(6)`, i.e. `C%(6)` will now equal 2.

`TYPE C%(6),130`

will move the sprite into link space 2, so it will automatically be 'linked' to sprite 3, i.e. its parameters will be

copied into sprite 3, i.e. `C%(6)` will still equal 2.

`TYPE C%(6),170`

moves sprite `C%(6)` into zone 3. Sprite 3,6 will automatically be disabled, and the value of `C%(6)` will change to 3.

Using this system, it is quite

Figure 2

<code>TYPE [zone],[sprite]</code>	enable sprite i.e. make sprite visible.
<code>TYPE [zone],[sprite]</code>	disable sprite.
<code>TYPE [zone],[sprite],[x co-ordinate]</code>	set X Position.
<code>TYPE [zone],[sprite],[y co-ordinate]</code>	set Y Position.
<code>TYPE [zone],[sprite],[definition no.]</code>	set pointer to sprite definition (i.e. PRAM)



<code>(MISC) [zone][sprite]</code>	set sprite to hi-res mode (i.e. Mode00).
<code>EMUL [zone][sprite]</code>	set sprite to MULE-colour mode.
<code>COL [zone][sprite]</code>	set sprite COLour.
<code>EMCO [zone][colour]</code>	set MultiColour 0.
<code>EMCI [zone][colour]</code>	set MultiColour 1.
<code>STX [zone][sprite]</code>	Stretch X.
<code>STY [zone][sprite]</code>	Stretch Y.
<code>(PRT) [zone][sprite]</code>	set priority: sprite in PFont.
<code>(BAC) [zone][sprite]</code>	set priority: sprite at BACk.
<code>LACT [zone][sprite][integer array element]</code>	returns 1 in ARRAY%(SPRITE) if sprite is on (i.e. ACTive); returns 0 if sprite is off.
<code>EHIT [zone][sprite][integer array element]</code>	returns 0 in ARRAY%(SPRITE) if no collision, 1 if sprite to sprite; 2 if sprite to data; 3 if both.
<code>MDV [sprite integer array][x offset], [y offset][number of moves][x integer array], [y integer array]</code>	MOVes sprite through (x,y) for set number of moves, starting the new co-ordinates in XARRAY%(SPRITE), YARRAY%(SPRITE).
<code>EP [pace]</code>	sets the Pace of BASIC relative to the movement of sprites, from 0 to 200. 0: BASIC slows/sprites fast 200: BASIC fast/sprite slow
<code>ER</code>	stops all sprites being MOVed, and clears LINK table, i.e. Resets.
<code>EQ</code>	Quits split sprite.
<code>SYS 0012</code>	cold start.
<code>SYS 0015</code>	warm start.

pointless to move sprites vertical about the screen, as long as it relevant sprite in the new zone is available. A sprite expanded in the y axis (see CSET 7) will always need to be linked. CYPO takes this into account but the sprite must be expanded before CYPO is called.

This alternative syntax can be used with all the commands with the `[name] [syntax]` parameters, in which case the commands will affect the "limited" scope also. However, please note that the `INTEGER ARRAY` must be declared before it is referred to by one of these commands. This advice occurs naturally when an initial value is assigned to an element in the array, but if not, an "unused statement" error message will be shown.

### Writing Section

A command which takes this idea even further is **CMOV**. This command moves a sprite by hooking it on to what I call an "interrupt" routine, which is like an interrupt routine, but even better, as it waits for Basic to finish its present command before taking over a sort of multitasking.

0004 0000 0000 0000 0000 0000 0000 0000

will move sprite C%T) from (x,y) to (x+y+4). If there is, again, time, storing the new coordinates in C%T),C%Y),C%T). The frequency of these moves against the speed of Basic is controlled by the IP (page) command where page values have any value between zero and 200. Again, the relevant arrays must be declared before the command is used. Up to 20 sprites may be **MOVED** at any one time.

Other commands which pass values to an array are FACT and FACT.

## The Book

Loaded with the **SPLIT WHITE LOADER** is a demonstration program using many of the new commands. It is probably most constructive to RUN this while following the listing, which I have tried to make as clear as possible. The program waits between the main sections so you can work out what is going on.

Before loading the demo program, make sure you have run the case file



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DEMO SET-UP program, which  
moves the bottom of Basic up to  
BASIC to make room for the sprite  
definitions.

When running the demonstration  
program, please note the last section  
which uses the SHIT command to  
detect collisions. As the sprites move  
back and forth, every so often they  
detect a "weakness" in the system,  
when a perfectly good collision is not  
registered. This is because it takes a  
tiny time to transfer all the data to  
and from the VIC registers at each  
interrupt, and as a result it sometimes  
happens that VIC is looking in the  
wrong direction when the collision  
occurs. In fact there are some dead  
spots in mid "link space" where no  
collisions are registered at all. If this  
proves critical, it often helps to use a  
different sprite number, so engineers  
the collision to occur at a different  
point. Alternatively, a more reliable  
system is to check for collision by  
comparing the array elements  
containing the sprite co-ordinates.

When writing a program using  
SPRIT SPRITE, it is important to  
remember that changing a line of  
Basic, or re-RUNNING the program  
clears all the variables. If there is still a  
sprite loaded even the MOV routine  
when you next enter any Basic  
command, the MOV routine will be  
called and will be unable to locate the  
relevant arrays. This will give an error  
message, which does not really matter,  
but the way to avoid it is to initialize it  
beforehand.

SPRIT SPRITE itself is presented  
here as a Basic Loader. When POKED  
into memory, the program resides at  
BASIC — BLOAD. Life will obviously  
move faster if, once loaded, you save  
the block of memory for future use,  
with a machine code monitor.

The program uses the rest of the  
BASIC block along with BLOAD — BLOAD  
to store variables, and is initialized by  
BASIC BLOAD.

A final thought: if you do write a  
manipulate with SPRIT SPRITE (and  
want to save it to tape, make sure you  
load the program first to avoid timing  
problems, as I would have to be  
responsible for the kind of grief I  
experienced when, while writing  
SPRIT SPRITE and preparing to  
make a back-up copy of my work so  
I accidentally re-formatted the  
only disk I had it on. Aagh! ☹

# PROGRAM: SPRIT LOADER

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# Arcade Action

*Ideas, tips and programs to help in writing your own arcade games*

*By Tony Crowther*

**P**roducing your first arcade game need not be the difficult chore that many people believe it to be. All that is required is a good strong idea as to the basis of the game and an understanding of how all of the different parts are going to work.

In order to produce a quality game then it should of course be written in machine code. It is a lot harder to write a program in machine code than Basic, however, the increased speed of execution is essential to a good program.

It is outside the scope of this series to actually teach you about machine code. Should you be interested in learning then you could take a look at a series *Welcome to the Machine* that started in the March *Wissen of Your Commodore* and finished in December, '88.

I am aware that many people will not be ready to tackle the rigors of machine code just yet. Don't let this put you off. Many good programs are written as a mixture of Basic and machine code.

During this series I will be presenting a series of small programs that you can use yourselves, either as part of a larger machine code program or simply called from within your own Basic program.

The series will be concentrating on programming with the C64, if you are a C16 or Plus/4 owner don't worry, whenever possible I will provide programs that will work on these machines.

## What's to Come

So what will we be looking at? For a start I will be discussing the use of User Defined characters within your programs, how to use them and move them. Sprites will be dealt with in detail complete with routines to animate them and move them around your screen. Many games use backgrounds that are larger than the screen. The screen acts as a window over the larger playing area. I will be explaining how this is done and again provide routines to do this in your own programs.

A number of miscellaneous routines will also be provided for your use. These will include routines to scroll messages on the screen, print and increment scores, character editors, music programs and many more.

## Presentation

Most of the programs that are presented in this series will be in machine code. I will be giving both the source code for the program and a Basic loader for those of you who don't want to tackle the assembly.

The assembly language programs have been produced using the Commodore Macro Assembler. I have tried to keep the assembly language as simple as possible so should you use a different assembler you should be able to enter the programs with very few changes.

## Starting Out

In this month's article I am afraid that I am going to make you jump straight in at the deep end and deal with something that is extremely important

```
10 REM * C16 INQ DEMO ROUTINE *
20 FOR A=818 TO 842:READ C:E=C+C
: POKE A,C: NEXT
25 IF E<> 2557 THEN PRINT "ERROR
IN DATA":STOP
30 DATA 120,169,63,141,10,3,169,
3,141,21,3,88,96
40 DATA 162,0,147,25,255,202,208
250,76,24,208,0
50 PRINT"[DOWN][DOWN] SYS 818 TO
START"
```



```

3 REM * C64 INTERRUPT DEMO ROUT1
4 *
5 BL=1      LN=50      SA=49152
20 FOR I=0 TO BL:CK=0:FOR D=0 TO
15:READ A:CK=CK+A:POKE SA+L*16+
D:A=INT D
30 READ A:IF A>CK THENPRINT"ERR
08 IN LINE";LN=(L*10)+STOP
40 NEXT L
50 DATA 120,149,13,141,20,3,169,
192,141,21,3,88,96,162,0,143,148
0
60 DATA 32,208,202,208,250,76,49
,234,5,0,0,0,0,0,0,0,1264
70 PRINT"[CLEAR][DOWN][DOWN][DOWN
N]SYS 49152 TO START FOR C64"

```

FIGURE 1

is a game writer — interrupts.

In the coming months I will be going back to simpler subjects, however many examples that I will be giving will require a knowledge of interrupts and use the IRQ program that I am going to give this month.

### Let Me Interrupt

So, just what is this thing that is so important to games writing? Well it's really as simple as its name suggests: it is an interruption of whatever the computer is doing. Let me illustrate what I mean with a simple everyday example.

Let's suppose that you are having a conversation with someone on the telephone rings and interrupts your conversation. You leave the conversation and go and answer the telephone. If the call is for you then you would now hold a conversation with the person on the other end of the telephone. When you had finished you would put the telephone down and go back to and continue your original conversation.

What has happened is that the ringing of the telephone simply interrupts and pauses your original conversation for a short while and you carried on where you left off upon returning.

So what about interrupts in programming?

Let's take a look at a practical example. If you were to write a program that required you to move a

sprite across the screen you may write a routine that went along the following lines:

1. This is the main program.
2. The main program becomes interrupted by the routine that moves the sprite.
3. The sprite is moved by the routine.
4. Once the sprite has been moved we go back to step(1) and continue where we left off.

This is of course an over simplification but should give you an idea of what an interrupt can do.

FIGURE 2

```

10      ;*****
20      ;+ INTERRUPT / PENDING +
30      ;+ BORDER IDENTIFICATION +
40      ;+ CALL VECTOR +
50      ;*****
60      ;*****
70      ;*****
80      ;*****
90      ;*****
100     ;*****
110     ;*****
120     ;*****
130     ;*****
140     ;*****
150     ;*****
160     ;*****
170     ;*****
180     ;*****
190     ;*****
200     ;*****
210     ;*****
220     ;*****
230     ;*****
240     ;*****
250     ;*****
260     ;*****
270     ;*****
280     ;*****
290     ;*****
300     ;*****
310     ;*****
320     ;*****
330     ;*****
340     ;*****
350     ;*****
360     ;*****
370     ;*****
380     ;*****
390     ;*****
400     ;*****
410     ;*****
420     ;*****
430     ;*****
440     ;*****
450     ;*****
460     ;*****
470     ;*****
480     ;*****
490     ;*****
500     ;*****
510     ;*****
520     ;*****
530     ;*****
540     ;*****
550     ;*****
560     ;*****
570     ;*****
580     ;*****
590     ;*****
600     ;*****
610     ;*****
620     ;*****
630     ;*****
640     ;*****
650     ;*****
660     ;*****
670     ;*****
680     ;*****
690     ;*****
700     ;*****
710     ;*****
720     ;*****
730     ;*****
740     ;*****
750     ;*****
760     ;*****
770     ;*****
780     ;*****
790     ;*****
800     ;*****
810     ;*****
820     ;*****
830     ;*****
840     ;*****
850     ;*****
860     ;*****
870     ;*****
880     ;*****
890     ;*****
900     ;*****
910     ;*****
920     ;*****
930     ;*****
940     ;*****
950     ;*****
960     ;*****
970     ;*****
980     ;*****
990     ;*****
1000    ;*****

```

Before it or not your computer is actually being interrupted every 1/30th of a second by the computer's hardware. Everytime an interrupt occurs the computer takes a look at a memory location which holds information about where the interrupt program is stored. These couple of memory locations are referred to as the interrupt vector. In normal use whenever an interrupt occurs the interrupt vector holds the address of the general routines which first alter the general running of the computer. These routines are items such as scanning the keyboard to see if a key has been pressed etc.

The interrupt vector is stored at the following memory locations:

768 and 769

These locations are the same on all the Commodore machines we are using.

So how do you use this in your own programs?

### In Practice

Let's take a look at a practical example. Figure 1 gives a basic loader for a machine code program that uses interrupts. Note there are two versions of the program one for the C64 and one for the Plus/4 and C16.



```

1000 REM C64 IRQ DATA BASE LOADER
R
2000 FOR L=0TO9:CK=0:FOR D=0TO15:R
DATA:CK=CK+A:POKE49152+L*16+D,A:
NEXT D
3010 READ:IFA<>CK:THE$PRINT"ERRR
R. IN LINE":2040:(L*16):STOP
3020 NEXT L:END
3040 DATA120,162,0,169,0,157,63,
3,332,224,192,144,248,162,0,169,
2045
3050 DATA0,170,157,0,157,157,0,1
58,157,0,159,232,208,244,169,81,
2049
3060 DATA137,88,192,149,192,157,
69,192,232,232,232,224,30,144,23
9,169,2738
3070 DATA0,141,14,220,169,82,141
20,3,169,192,141,21,3,169,0,148
3
3080 DATA141,18,208,169,37,141,1
7,208,169,1,141,25,208,141,36,20
8,1648
3090 DATA88,96,169,1,141,25,208,
32,0,0,32,0,0,32,0,0,824
3100 DATA32,0,0,32,0,0,32,0,0,32
,0,0,32,0,0,32,192
3110 DATA0,0,32,0,0,76,49,234,12
0,169,48,141,20,3,169,234,1296
3120 DATA141,21,3,169,1,141,14,2
20,169,131,141,25,208,169,340,14
1,1924
3130 DATA26,208,88,96,255,255,25
5,255,255,255,255,255,255,255,25
5,255,3478

```

FIGURE 3

When you run this program it simply POKEs a short machine code routine into memory. To start this machine code routine simply type the SYS instruction which is printed by the program.

What this program does is to change the border colors every time an interrupt occurs. Because interrupts occur extremely quickly the flash rate is so high that the different colors appear as a number of flashing bands.

You may notice that the border is still flashing even though the computer has returned to the READY prompt. You can list any program that is in

memory or store type in a new program and the border will continue to flash. This is because, as I stated earlier, the computer is always being interrupted every 1/50th of a second and our little screen flash routine is run every time an interrupt occurs.

## The Machine Code

So let's have a look at our machine code program and have a look at what it does. Figure 3 gives the source code for the C64 version of the border flash routine. The C16 version is almost identical apart from the locations that

are used to change the border colors.

The program is actually in two separate parts. The first section actually alters the IRQ vector so that it holds the location of our border flash routine, section two of our little demonstration.

Taking the program line by line this is what it does:

1. We turn off the interrupts with the SEI instruction. The reason for turning them off is quite simple. We are going to change the vector that is jumped to when an interrupt occurs. Since interrupts occur every 1/50th of a second, if we didn't switch off the interrupts then it is possible that an interrupt would occur before we had changed both memory locations. If this was the case then the computer would not jump to our routine but rather to some other location in memory and the computer would probably crash.

2. After turning off the interrupts we alter the IRQ vector so that it points to our border flash routine.

3. Now we turn the interrupts back on.

Of course the interrupt vector isn't changed until you execute the program with a SYS instruction.

Our border flash program is extremely simple, all it does is to load the X register with the number 0. This is then stored in the border color location. The X register now has 1 subtracted from it. Note in machine code if you subtract a 1 from a memory location that contains a 0 it will become 255. The program then loops around until the counter gets back to zero when it jumps to the normal interrupt routines - keyboard scanning etc.

By normal interrupt routines what I mean is that we jump to the routine that is normally executed when an interrupt occurs. In other words we jump to the routine whose address is stored in the IRQ vector when the computer is switched on.

## Going further

I hope that the above demonstration and supporting test makes it a fairly clear as to what an interrupt is. The interrupts we have been dealing with are hardware interrupts that are generated every 1/50th of a second.



There are other ways of generating interrupts, for example the raster interrupt which can cause an interrupt depending on the position of the raster on the TV screen. However, at this time we don't really need to go into the other types of interrupt as we will deal with them as required.

## IRQ Database

As I have already stated we will be using interrupts quite frequently within this series. In order to make them easier to use with our numerous routines you will find in Figure 3 the

Basic loader for a C64 machine code routine which I call **IRQ DATABASE**. Figure 4 has the source for this for those of you who want to follow it through and see how it works.

This program functions by setting up a 'data base' of switches which are used to turn each routine on and off.

Each routine will be allocated a position in the database and can be turned on and off by simply **POKE**ing a 1 or 0 into the relevant location of the database. For example on the C64 should you enter:

**POKE \$B4,1**

then the Message Scroll routine will be enabled. Of course the Message Scroll routine needs to be present in memory and this will be printed in a later part of the series.

## Next Month

Have you ever wondered how you get moving objects in programs? If any of you have seen either of my *Blogger* games then the moving conveyor belts and ladders are the type of things I mean. Well next month I will provide a routine that will allow you to perform this with ease in your own programs.

<b>FIGURE 4</b>		1150	IRX
1000	*****	1160	CPE #70
1010	**** INTERRUPT ROUT ****	1170	BCC LOOP2
1020	*****	1180	LDA #0
1030	*****	1190	STA TIMERA ;TIMER A OFF
1040	*****	1200	LDA #PROG2 ;POINT IRQ VECTOR
1050	*****	1210	STA
1060	*****	1220	STA CIRQ ;TO PROG
1070	*****	1230	LDA #PROG2
1080	*****	1240	STA CIRQ+1
1090	*****	1250	LDA #0
1100	*****	1260	STA REBRAG
1110	*****	1270	LDA #27 ;CLEAR BIT 8
1120	*****	1280	STA RASCON
1130	*****	1290	LDA #0
1140	*****	1300	STA INTPLC ;TURN ON RASTER
1150	*****	1310	STA IPMASK ;CONTROL
1160	*****	1320	CLI
1170	*****	1330	IRX
1180	*****	1340	IRX
1190	*****	1350	IRX
1200	*****	1360	IRX
1210	*****	1370	IRX
1220	*****	1380	IRX
1230	*****	1390	IRX
1240	*****	1400	IRX
1250	*****	1410	IRX
1260	*****	1420	IRX
1270	*****	1430	IRX
1280	*****	1440	IRX
1290	*****	1450	IRX
1300	*****	1460	IRX
1310	*****	1470	IRX
1320	*****	1480	IRX
1330	*****	1490	IRX
1340	*****	1500	IRX
1350	*****	1510	IRX
1360	*****	1520	IRX
1370	*****	1530	IRX
1380	*****	1540	IRX
1390	*****	1550	IRX
1400	*****	1560	IRX
1410	*****	1570	IRX
1420	*****	1580	IRX
1430	*****	1590	IRX
1440	*****	1600	IRX
1450	*****	1610	IRX
1460	*****	1620	IRX
1470	*****	1630	IRX
1480	*****	1640	IRX
1490	*****	1650	IRX
1500	*****	1660	IRX
1510	*****	1670	IRX
1520	*****	1680	IRX
1530	*****	1690	IRX
1540	*****	1700	IRX
1550	*****	1710	IRX
1560	*****	1720	IRX
1570	*****	1730	IRX
1580	*****	1740	IRX
1590	*****	1750	IRX
1600	*****	1760	IRX
1610	*****	1770	IRX
1620	*****	1780	IRX
1630	*****	1790	IRX
1640	*****	1800	IRX
1650	*****	1810	IRX
1660	*****	1820	IRX
1670	*****	1830	IRX
1680	*****	1840	IRX
1690	*****	1850	IRX
1700	*****	1860	IRX
1710	*****	1870	IRX
1720	*****	1880	IRX
1730	*****	1890	IRX
1740	*****	1900	IRX
1750	*****	1910	IRX
1760	*****	1920	IRX
1770	*****	1930	IRX
1780	*****	1940	IRX
1790	*****	1950	IRX
1800	*****	1960	IRX
1810	*****	1970	IRX
1820	*****	1980	IRX
1830	*****	1990	IRX
1840	*****	2000	IRX
1850	*****	2010	IRX
1860	*****	2020	IRX
1870	*****	2030	IRX
1880	*****	2040	IRX
1890	*****	2050	IRX
1900	*****	2060	IRX
1910	*****	2070	IRX
1920	*****	2080	IRX
1930	*****	2090	IRX
1940	*****	2100	IRX
1950	*****	2110	IRX
1960	*****	2120	IRX
1970	*****	2130	IRX
1980	*****	2140	IRX
1990	*****	2150	IRX
2000	*****	2160	IRX
2010	*****	2170	IRX
2020	*****	2180	IRX
2030	*****	2190	IRX
2040	*****	2200	IRX
2050	*****	2210	IRX
2060	*****	2220	IRX
2070	*****	2230	IRX
2080	*****	2240	IRX
2090	*****	2250	IRX
2100	*****	2260	IRX
2110	*****	2270	IRX
2120	*****	2280	IRX
2130	*****	2290	IRX
2140	*****	2300	IRX
2150	*****	2310	IRX
2160	*****	2320	IRX
2170	*****	2330	IRX
2180	*****	2340	IRX
2190	*****	2350	IRX
2200	*****	2360	IRX
2210	*****	2370	IRX
2220	*****	2380	IRX
2230	*****	2390	IRX
2240	*****	2400	IRX
2250	*****	2410	IRX
2260	*****	2420	IRX
2270	*****	2430	IRX
2280	*****	2440	IRX
2290	*****	2450	IRX
2300	*****	2460	IRX
2310	*****	2470	IRX
2320	*****	2480	IRX
2330	*****	2490	IRX
2340	*****	2500	IRX
2350	*****	2510	IRX
2360	*****	2520	IRX
2370	*****	2530	IRX
2380	*****	2540	IRX
2390	*****	2550	IRX
2400	*****	2560	IRX
2410	*****	2570	IRX
2420	*****	2580	IRX
2430	*****	2590	IRX
2440	*****	2600	IRX
2450	*****	2610	IRX
2460	*****	2620	IRX
2470	*****	2630	IRX
2480	*****	2640	IRX
2490	*****	2650	IRX
2500	*****	2660	IRX
2510	*****	2670	IRX
2520	*****	2680	IRX
2530	*****	2690	IRX
2540	*****	2700	IRX
2550	*****	2710	IRX
2560	*****	2720	IRX
2570	*****	2730	IRX
2580	*****	2740	IRX
2590	*****	2750	IRX
2600	*****	2760	IRX
2610	*****	2770	IRX
2620	*****	2780	IRX
2630	*****	2790	IRX
2640	*****	2800	IRX
2650	*****	2810	IRX
2660	*****	2820	IRX
2670	*****	2830	IRX
2680	*****	2840	IRX
2690	*****	2850	IRX
2700	*****	2860	IRX
2710	*****	2870	IRX
2720	*****	2880	IRX
2730	*****	2890	IRX
2740	*****	2900	IRX
2750	*****	2910	IRX
2760	*****	2920	IRX
2770	*****	2930	IRX
2780	*****	2940	IRX
2790	*****	2950	IRX
2800	*****	2960	IRX
2810	*****	2970	IRX
2820	*****	2980	IRX
2830	*****	2990	IRX
2840	*****	3000	IRX
2850	*****	3010	IRX
2860	*****	3020	IRX
2870	*****	3030	IRX
2880	*****	3040	IRX
2890	*****	3050	IRX
2900	*****	3060	IRX
2910	*****	3070	IRX
2920	*****	3080	IRX
2930	*****	3090	IRX
2940	*****	3100	IRX
2950	*****	3110	IRX
2960	*****	3120	IRX
2970	*****	3130	IRX
2980	*****	3140	IRX
2990	*****	3150	IRX
3000	*****	3160	IRX
3010	*****	3170	IRX
3020	*****	3180	IRX
3030	*****	3190	IRX
3040	*****	3200	IRX
3050	*****	3210	IRX
3060	*****	3220	IRX
3070	*****	3230	IRX
3080	*****	3240	IRX
3090	*****	3250	IRX
3100	*****	3260	IRX
3110	*****	3270	IRX
3120	*****	3280	IRX
3130	*****	3290	IRX
3140	*****	3300	IRX
3150	*****	3310	IRX
3160	*****	3320	IRX
3170	*****	3330	IRX
3180	*****	3340	IRX
3190	*****	3350	IRX
3200	*****	3360	IRX
3210	*****	3370	IRX
3220	*****	3380	IRX
3230	*****	3390	IRX
3240	*****	3400	IRX
3250	*****	3410	IRX
3260	*****	3420	IRX
3270	*****	3430	IRX
3280	*****	3440	IRX
3290	*****	3450	IRX
3300	*****	3460	IRX
3310	*****	3470	IRX
3320	*****	3480	IRX
3330	*****	3490	IRX
3340	*****	3500	IRX
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3800	*****	3960	IRX
3810	*****	3970	IRX
3820	*****	3980	IRX
3830	*****	3990	IRX
3840	*****	4000	IRX
3850	*****	4010	IRX
3860	*****	4020	IRX
3870	*****	4030	IRX
3880	*****	4040	IRX
3890	*****	4050	IRX
3900	*****	4060	IRX
3910	*****	4070	IRX
3920	*****	4080	IRX
3930	*****	4090	IRX
3940	*****	4100	IRX
3950	*****	4110	IRX
3960	*****	4120	IRX
3970	*****	4130	IRX
3980	*****	4140	IRX
3990	*****	4150	IRX
4000	*****	4160	IRX
4010	*****	4170	IRX
4020	*****	4180	IRX
4030	*****	4190	IRX
4040	*****	4200	IRX
4050	*****	4210	IRX
4060	*****	4220	IRX
4070	*****	4230	IRX
4080	*****	4240	IRX
4090	*****	4250	IRX
4100	*****	4260	IRX











# Printmaster

*Create your own headed paper, greetings cards or other forms of stationery with this program from Ariolasoft.*

*By Evelyn Mills*

**P**rintmaster by Ariolasoft is a very extensive program with an overwhelming selection of options which, in my opinion, give it a very high rating in the operative field of creating your own graphics stationery. Performance is smooth, impeccable and the program is dedicated to the user in every respect.

On loading, the main menu gives the following options: Greeting Card, Sign, Stationery, Calendar, Banner, Graphic Editor and setup. The latter is for printer output options; while Printmaster (PMS) is preset for the Commodore 1229/801, the printer output will allow conversion for Epson, Star, Okimate, Oki and C-Hex printers.

## Editor

So what do we choose first from the main menu? I would suggest Graphics Editor to familiarise yourself with the graphics on the disk and also to experiment with creating your own graphics. Having highlighted the option, choose 'graphics by picture'.... Here you will find 130 plus superb graphics for your inspection and use! Some of these graphics are relatively standard, a large proportion are very novel, but each and every one is very well designed for maximum graphic effect.

On display with your graphics, there is a side menu which allows you to edit, clear, invert, flip horizontally, flip vertically, save to disk or print (each graphic occupies three blocks on saving); inversion and flipping are shown very rapidly on screen. Editing

and creating both have four functions controlled by F1 which handles drawing, shading, toggling and erasing. Drawing gives solid lines, shading gives dotted lines while toggling draws and erases where lines cross; the shading and toggling combination gives excellent 3D effects. All functions are joystick controlled, F1 setting the mode of operation for you.

## Cards

Greeting Card: Here there are seven borders from which to choose, including a few unconventional ones such as 'creaking ants' - the programmers really enjoyed making this software. Eight fonts are available and there is space for seven lines of text (38 columns width) so there is no need to stick to the usual conventional, cryptic greeting. Both upper case and lower case may be used. Naturally a graphics selection is available in either small, medium or large mode.

Now the program really gets interesting - you can stagger your graphics in a set manner or place them where you wish. At this point the direction keys 1, 3, 5 and 7 interplay with one another. F1 positions writing to left centre or right, F3 alters size, F5 alters style while F7 alters the font. Effectively then, you may interchange positions and change fonts within any one graphic; should you overflow with enthusiasm, the screen will say so and it can be sorted out with the delete key. While you are still creating a Greeting Card, there is a Front Page and an Inside Page for you to see.

## What have you done?

Now keep moving along ( plenty of screen prompts) and you will be given the chance to PREVIEW what you have done. This, I think, is an excellent option. If you don't like what you have designed, back-step with the key and change it all. For a really radical change go back to the Main Menu and start all over again. If you like it - save the whole thing to disk for use at a later date (change a few names around when you reload if you wish) or print it out directly. Now who could ask for more than that?

The function is operative all through the program and allows you to back-step at any point for editing.

## Making Signs

The SIGN Facility operates in a similar manner, and gives you a one page presentation with all the facilities described above including seven lines of entry.

Stationery naturally creates your own paper heading. Here the graphics may be to the left, to the right, 'tilted' or a row of three. Both the top and bottom of the page are programmable; note - the RESTORE Key stops printer output - so don't go too far away or you will have multiple pages at your feet. On the other hand, try half a page if you want!

## What's the date?

The CALENDAR: very good is this again choose your graphics, and font,



plus months and year. The 12 calendar months are listed and are selected by highlighting; the year is listed as 1988 which may be changed as directed; you are now asked for a monthly or weekly calendar.

The Monthly calendar selection gives the menu: continue, after loading, and enhance date.

With 'after loading' the font may be changed with F1 while the typed heading at the top may be altered with the delete key and input from the keyboard. Anyway assuming that you are quite happy with what you see, select 'enhance date', from this option you can now enter three lines of five characters each for any one date to remind you of who's who and what's what. Again you get a preview of your monthly calendar picture.

Yes, if you choose any particular year, the calendar will start on the correct day and date of that year. Leap Years? - all course they are covered for.

If you choose the weekly option you will then be asked for generic or specific options. The GENERIC format is not dated and the output is full screen with Sunday to Saturday of any one week (of any one month, of any one year) running downwards with blanked, fixed spaces running transversely for you to write on at a later date (in pen, pencil or what not). The SPECIFIC format is similar but dated. Again you may have a preview before printing. The Calendar also supports graphics.

#### Long Notices

On to the BANNER which gives you graphics, fonts and one line of writing up to 39 characters long. This also uses F1 for font changing thus allowing you to 'mix it up'.

All through the program upper and lower case may be used as can REVERSE MODE for both graphics and print. Fonts can be single, solid or 3D. The 3D effect can be a bit startling but what displeases my eye may well please yours.

Now if you cannot create with this program don't blame the back room boys. They have given you a disk full of powerful commands to implement plus excellent on screen instructions. The end result is very pleasing in the

# DeVille Scribe Office Hampton Times Western Utopia Computer



eye. The ability to back step, change fonts and words and preview your material before printing is an inspiration - plus the fact that, not only can you save graphics alone, you can save the whole card, calendar, banner or whatever. A five star epic.

#### Finalities

Name: *Printshop* Price: £29.94 Machine  
C&I Supplies, Ashleurst, 68 Langham,  
Convent Garden, London WC2R 9AF Tel  
0875 816 1001.



# Percussion Section

*Building add-ons for your computer sounds like a daunting task, however Maplin's Computadrum makes it possible for amateurs.*

*By Neil Day*

**M**y friend who knows about such things said I was crazy to try, but I wanted to build something to add on to my C64. I think I found the ideal beginner's project in a cheap drum synthesiser kit from Maplin, a large electronics chain and mail order firm.

*Computadrum* is supplied as a packet of components with a printed circuit board. The kit will work with a number of different noises including the C64 and Vic 20. It should also work on a C128 or C64 mode, but I haven't tried it.

The unit provides six separate channels, or different drum sounds. Each channel can be tuned for pitch and resonance by altering the setting of variable resistors on the circuit board with a small screwdriver. Software can be used to switch each channel on or off and to control the time between each beat. You might think this would give access to six sounds only. You'd be wrong. The six channels can be mixed in any combination. In effect, this gives you access to a large variety of sounds.

I'm told, by my friend who knows, that commercial drum synthesisers will do more, and the software provided is better. The *Computadrum* has one big advantage over these—you construct it yourself, and, in the process, learn a lot about the wonderful mysteries of the user port. That's what I now know to call the hole you can find on the left-hand side of the back of your C64.

Signals, controlled by the computer, come from this port and are

plugged into the *Computadrum* unit, inside the unit these signals are used to generate the six drum sounds. The resulting signals emerge from a lead from the unit that has to be connected to the line-in or audio-in socket of an audio amplifier or monitor.

The packet supplied contains all but a box to house the unit and the leads. For the lead into the drum unit from the C64 computer you need a seven pin din plug, a couple of feet of seven way cable for the six lines plus ground, and a 24 way edge connector to plug into the computer. The output lead will depend on the type of amplifier or monitor or you are going to use. Most commonly a single RCA type plug is required. A very professional looking box to house the unit can be supplied by Maplin for about £5.80. Cheaper ones are available too, or you could probably improve one.

If, like me, you have never previously assembled electronic equipment, you may start out feeling a bit apprehensive. However, the process is easy. Maplin has a little brochure called *Component Guide* (ref. 66791). It costs just 25p and tells you how to identify resistors, capacitors and other such beasts. I used the magnifying glass out of my daughter's stamp collection to read the values off the tiny components. I noted the value (ohms for resistors and farads for capacitors) on to a scrap of paper and then swapped up the components of the same value together in the paper. This meant that I did all

the identification of components (probably the hardest thing of all for me) in one swoop.

Sticking the components into the printed circuit board reminds me of knitting to a pattern, except it's a lot easier than the furthest sweater I laboured over for 18 months! Some hints need to be orientated correctly so that the positive end goes through the correct hole in the PCB, but this is always indicated in the very clear lettering on the board itself.

You are advised to poke in a few components at a time, and then solder them into position. You use small wire-cutters to remove the excess wire, protruding from the bottom of the board, and repeat the process until all the components are installed.

The last time I used a soldering iron was to mend the spouting; that was harder than soldering the components in place. The detailed advice in the *Constructors' Guide* and the project instructions helped me here. Large lumps of blue tack secured the board, leaving two hands free for the soldering. The only items that were at all tricky were the semiconductor because the pins on these are very close together. The final test point on your soldering from the easier it is.

Well, putting it all together takes a few hours, but in the process you read the excellent instructions and get a general idea of what each circuit does. Before long you've soldered the leads and it's time to test the unit.

Mine didn't work! I checked both for whiskers of solder shorting the







# Software for sale

*If you think that one of our programs looks very interesting, but you can't afford the time to type it in then our software service will help you out.*

**I**t's three o'clock in the morning. You sit at the computer keyboard just finished a marathon typing session entering one of the superb programs from Your Commodore. Your fingers reach for the keyboard and press the letters R, U and N. You press RETURN, sit back and nothing happens.

Everyone has probably faced this problem. When it does happen it's a matter of spending hours searching through the program for any typing mistakes. No matter how long you look or how many people help you, you can usually guarantee that at least one little bug slips through unnoticed.

The Your Commodore Software Service makes available all of the programs from each issue on both cassette and disk at a price of \$5.00 for disk and \$4.00 for cassette. None of the documentation for the programs is supplied with the software since it is all available in the relevant magazine. Should you not have the magazine then back issues are available from the following address:

INFONET LTD, Tynes House, 178 The Markways, Heron  
Pompey, Hants. HP1 1BB.  
TEL: (0425) 68425

please contact this address for prices and availability.

## The Disk

Programs on the disk will also be supplied as totally working versions, i.e. when possible we will not use Basic loaders thus making use of the programs much easier. Unfortunately at the moment we cannot duplicate C16 and Plus/4 cassettes. However programs for these machines will be available on the disk.

What programs are available?

At the top of each article you will find a stamp containing the article type, C64 Program etc. So that you can see which programs are available on which format you will also find a couple of symbols after the stamp. The symbols have the following meaning:



This symbol means that the program is available on cassette.



These programs are available on disk.

## Please Note

Since the programs supplied on cassette are total working versions of the program, we do not just disk only programs on tape. There is no sense in placing a program that expects to be reading from disk on to tape.

## NOVEMBER 1986

**Two The Eighties** — now you can give your C64 80 column capability, with this program. You have access to two screens either the 40 column version or the new 80 column one.

**C16 SOUND SAMPLER** — now your C16 or Plus/4 can sound like any instrument you like with the sound sampler. Available on disk only.

**C64 ALTERNATE** — You've been programming for hours and your computer crashes taking all of your work with it. Well, you can prevent this with our C64 Alternate. This will save your programs to disk or tape every five minutes automatically so you won't have too much work to catch up on. **DATAMAKER 128 & C64** — Two excellent datamaker programs one for the C128 and one for the C64.

**ORDER CODE**  
**DISK TIDESC66 \$5.00**  
**TAPE YCNOV86 \$4.00**

## DECEMBER 1986

**WIMP** — Create your own graphics operating system in your own programs. Complete with pull down menus and sample icons.

**REMEMBER THE PLUS/4** — An assembler for Plus/4 owners. Complete with a couple of new Basic commands including a MERGE facility.

**ORDER CODE**  
**DISK TIDESC66 \$5.00**  
**TAPE YCDEC86 \$4.00**

## JANUARY 1987

**SELECT MENU 128** — Add a menu program to your C128 disk collection.



**DISK ARCHIVE** — Now you can make a total backup of all your disks on to cassette for safe keeping. A complete disk was five minutes of tape (C64).

**TAPE HEADER** — Find out where your cassette based programs start in memory. For the C16 (Jan Disk only).

**ANIMATOR** — Generate your own animated character sequences with this program for the C64.

**HUMPER** — Produce copies of your Plus/4 text and Hi-res screens with this handy screen dump program (Jan disk only).

**ORDER CODE**

**DISK YDIAN87 £6.00**

**TAPE VCJAN87 £4.00**

## FEBRUARY 1987

**TERMO MENU MAKER** — Add menus and high speed loading to your disks (C64 — disk only).

**HEX DATA ENTRY** — Your Commodore program entry system.

**GRAY FILE** — Get more information from your disk drive (C64 disk).

**ADVENTURE AID GRAPHICS** — Easy graphics for our Adventure Creator system.

**LABELLER 64** — Easy addressing with this label printer for the C64.

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**ORDER CODE**

**DISK YDI887 £6.00**

**TAPE VCY887 £4.00**

## MARCH 1987

**SPELLING CHECKER** — for use with the Plus/4 word processor — disk only.

**NINE LINE MATRIX** — Clearer 90 column displays on your C128.

**JOYSTICK READ** — Invaluable joystick routine for Basic programmers with a C64.

**LABELLER 64** — See February 1987.

**HEX DATA ENTRY** — Our machine code entry program for C64.

**WHIPS AND MUCH MORE** — An extension to our C64 Whips program plus a foolproof INPUT system.

**DISKIT** — Memory Saver, Program Compiler and One Part Maker. The first three parts of this popular series for C64 and disk (Disk only).

**NURSERY RHYME LAND** — See February 1987.

**POPPER** — A game featuring Popper the green pea, for the C64.

**Order codes**

**VC MAR 87**

**TD MAR 87**

Cassettes or disks are available back to March 1986. Please ring the Editorial office (01-417-8636) for details of these.

## ORDER FORM — PLEASE COMPLETE IN BLOCK CAPITALS

NAME	QTY	TAPE/DISK	ORDER CODE	PRICE
March '87		TAPE (£4.00)	VC APR 87	
March '87		DISK (£6.00)	TD APR 87	
OVERSEAS POST £1				
			TOTAL	

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ADDRESS.....

POSTCODE.....

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All orders should be sent to: YOUR COMMODORE, READERS SERVICES, ARGUS SPECIALIST PUBLICATIONS, 9 HALL ROAD, HEMEL HEMPSTEAD, HERTS HP2 7DH.

Please allow 28 days for delivery.



# Device One

*A printer interface is one of the most important items you may ever buy. Device One could be just what you're looking for.*

*By Stuart Cooke*

**W**hen Commodore launched its range of home computers, the need to purchase Commodore products in the future was virtually built in. Should you require a disk drive then you would have to use Commodore's. If you wanted a printer then you would have to use Commodore's. All this is due to the fact that the computers have a non-standard interface.

Most of the popular printers such as Epson, Star and Citizen come complete with a customised interface making them unusable with a Commodore computer. To solve this problem many parallel interfaces have been built that enable you to use a parallel printer with a Commodore though none of them have been as powerful as the *Device One* from Precision Software.

The purpose of *Device One* is basically to link together a printer with a parallel interface to the Commodore computer. The computer talks to the printer in the normal way i.e. it thinks it is talking to a Commodore printer while the interface makes the printer behave as though it is a Commodore printer.

The actual casing for the interface is made from what appears to be a Vacko cartridge case. The only reservations that I have about the interface are partly due to this. Only part of the circuit board is covered and a large proportion of it is visible to the outside world. I can't help wondering if a metallic object such as a paper clip could find its way into the interface through this opening and cause havoc to the chips inside.

The interface itself contains 128K of RAM and 128K of ROM, there are four built in character fonts, so you can print listings in different faces. There is also the facility to print out in your own fonts, print pictures, calendars and banners.

## Documentation

The manual accompanying the interface was printed using *Device One* and its different fonts showing the flexibility of the interface. The manual is extremely clear with many examples used to illustrate different functions.

Many of the different commands are extremely difficult to remember, even though the manual does make it extremely clear how to use them, the interface therefore has its own (built) documentation. Hold down the reset button on the interface for more than three seconds and a brief summary of the available commands will be printed out for you.

## In Use

Setting up the interface is extremely simple. The interface plugs into the Commodore serial port and the printer, controls port. A third connection is made with a transformer to a constant mains socket.

The interface will work with no less than 25 different types of printer, all of the popular types such as Epson etc. are available. Selection of the printer type is simply made by altering the position of three switches on the front of the interface. Other switches determine if you require an emulsion feed and the mode of operation of the interface. There are four different modes of operation, 1525 emulation is, as its title suggests, total emulation of a Commodore 1525 printer, you also have access to all of the *Device One* features such as fonts and calendars.

Semi-transparent mode passes all commands directly to the printer without any conversion, however *Device One* commands will still work.

Transparent mode passes characters straight through to the

printer. *Device One* commands will not work.

ASCII mode passes all codes straight through to the printer except for characters. Any characters are translated from Post-ASCII to normal ASCII so that they are printed correctly on your printer.

## 1525 Emulation

When using this mode all of the Commodore printer commands such as double size work as you would expect. This means that you can now use any program that requires a Commodore printer without any problems at all.

## Device One Control

There are no fewer than 32 different commands that can be sent to the *Device One* interface. Commands can be sent to the interface in one of two ways. Either you can open a channel to the printer with a secondary address of 13 e.g.

OPEN 44,15

or you can send two escape codes (27) to the interface before a command.

Obviously there are far too many commands available to go into them all so I will concentrate on the main ones.

## Custom Fonts

One command will allow you to select the font that you would like to use. There are no fewer than six variations of this command and for many of them you must have down-loaded into the *Device One* the font that you require, note this is not the same as one of the four in-built fonts.

You can select a free-run font which



is made up of 678 dots. You may select a medium font which is made up of 378 dots. A hi-res font may be selected which is made up of 1278 dots on an Epson type printer or 1678 dots on some others.

One of the four in-built fonts may be selected. Figure 1 gives examples of each of these. You can select your printers normal font and Underline can be switched on or off.

### Downloading

In order to get fonts etc. into the interface you must select one of the seven download commands. Commands exist to download each of the different styles of font as well as

each line of the picture is printed. Should you send text to the printer you could print this over an illustration.

### Printing Calendars

There is an in-built calendar mode in the interface. This simply prints out a calendar for a specified month on your printer and can be printed in any font.

### Barriers

This mode will allow you to print any message sideways on to your printer, each letter of your message being as high as the width of the paper.

The *Device One* does improve these dramatically by printing each character twice. This gives a more professional finish to any printouts.

### Software

Not only does *Device One* come complete with its own built in software, it also comes complete with a disk full of it for the C64. The software included is:

**Printerize** - This allows you to convert pictures from most of the popular packages to *Device One* format.

**Font Editor** - This allows you to create your own fonts for use with your printer.

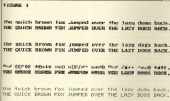
**Dump All** - This patches into your machine and allows you to get a screen dump at any time by holding down a few keys.

**Dump Test** - Similar to the above but this only prints text.

**Drawl** - A simple drawing package that allows you to create your own hi-res pictures.

**Print Utility** - A program that makes printing calendars, barriers or downloading pictures and fonts much easier.

**Font Capture** - This allows you to go through the memory of the computer so that you can capture any fonts that are used within your programs for use with your printer.



downloading a picture into the interface's RAM, sending a test file so that it is printed in transparent mode and downloading a disk drive to the printer. Downloading is extremely easy since once the interface is told to download it waits until you send it the necessary information. The easiest way to do this is to VERIFY the file that you require. This file isn't read into memory but is sent down the bus to the interface.

### Printing Pictures

Pictures can be printed in either full-tone or half-tone. Full-tone simply means that the image is in black and white while half-tone means that the interface will use shading to print out the different colours. In order to print a picture it must be downloaded into the RAM in the interface. Then each time the interface is told to print a line

### Laying It Out

Commands exist within the interface to set the page length of the interface and the left and right margins. For anyone who uses a wordprocessor that doesn't have header and footer commands the inclusion of this in the interface will be a welcome addition. You could even use headers and footers to print messages at the top and bottom of any listings that you print out.

### NLQ

Many people would love to have access to a daisy-wheel printer which prints extremely clear characters, however for most of us the price of these is far out of our reach and we are therefore stuck with the daisy products that our printers provide. The NLQ mode of

### Verdict

*Device One* is the most powerful printer interface that I have come across for the Commodore range of machines.

The interface is easy to use and the manual is clear enough for even a novice computer owner to get to grips with the interface without any problems.

The interface is expensive but well worth saving your pennies for, and especially since there are interfaces in the market that don't do as much and cost more.

### TakeNote

**Product:** *Device One*.  
**Company:** Precision Software, 8 Park Terrace, Worcester Park, Surrey KT4 5JZ. Tel 01 338 7766. Machine: C64/128.



# CP/M and the Commodore 128

*CP/M, much neglected mode of the C128, is probably the most useful for the serious user. Here we examine the Commodore version of this phenomenon.*

*By Microsoft Appleby*

**T**here are differences between the definitive CP/M and the Commodore implementation, however this article should enable you to understand just what those differences are, plus I hope to give you an idea of the more common transient programs supplied with the CP/M+ system.

## The Commodore Connection

If you read my article in *Four Commodore*, March 1987, you should remember that the CP/M system, as now defined, requires a 280 processor, 64K, an 80 column screen and one or two disk drives. The CP/M+ system, supplied with the C128, assumes 128K.

In the Commodore implementation there are a couple of changes made to this initial specification. The screen can be in either 40 or 80-column mode and, as most people can only have one disk drive, there is a software mechanism for treating it as two separate drives to make copying and various disk functions easier.

This is achieved through the use of drive 'E'. Normally to copy between two disks you need two drives, for instance 'A' and 'B'. The computer takes the information off drive A and puts it on to drive B. That works fine for dual drive systems, but most Commodores only have one drive, which makes things rather difficult. So Commodore came up with the drive 'F' system. Specifying a copy between drives A and E is like a single disk copy with drive A referring to the original and E referring to the copy. Although you can do it the other way around. The main point is that drive E doesn't exist. Only in the minds of the system's

programmer and everybody knows that most systems programmers are deranged anyway. This system is very good and simple to use and is a brilliant way around a rather tricky problem. It's much more useful for Commodore to leave something like that for the user to sort out.

## On Screen

The other anomaly in the Commodore CP/M system is the ability to use a 40 column screen. This is for the legions of C128 owners who have no 80 column monitor but just one of the old composite colour monitors or TVs. It operates by having a 40 column window on a logical 80 column screen. Everybody must recognise this from a large number of wordprocessors that run on the C64. This is probably the most ideal solution and the only real way to get some of the software working. This said, it is probably better to find a cheap green screen monitor and use that instead. There are some very good ones nowadays for around £90 and it is worth the investment if you are going to use CP/M for any length of time.

Though CP/M+ was designed to have a certain amount of room in the OS for graphical links, CP/M 2.2—the operating version that most CP/M programs were written under—has none. So most CP/M programs are monochrome anyway. Other than that you are best sticking to software that will run under 40 column CP/M file languages or programs written for the old C64 version of CP/M 2.2.

## On the Record

The other difference that is inherent in

all CP/M systems is the disk format. The disk format is the way that the disk controller tells the disk drive to write to the disk. As most people know, the process of writing to a disk is very similar to that of writing to tape. To take the analogy further, there are different ways of writing to tape and two distinct writing systems. One is 'Helical Scanning' as used in video recorders and the new Digital Audio Tape (DAT) system. This is incredibly complex and is beyond the scope of this article. The other method is the straight linear recording system.

Using this method, a certain amount of tape will pass the tape head in a certain amount of time. In that time a certain amount of data will be written to the head. There can also be between one and nine tracks on the head. Now as we know, different computers have different methods of writing data to tape; on tape this is known as the tape format. But, as disk is a known as the sector format. Also, the way in which the head writes to the tape is different, effectively how the varying magnetic field of the head affects the tape.

All these differences also apply to disks. The amount of data packed on to a linear of a disk is called the sector density and can vary between five and 16 for CP/M disks or 16 and 32 for Commodore disks. The number of tracks on a disk can vary between 33,40, and 80. There are three main ways of writing data to the disk FM, MFM, and Commodore GCR. And there are one or two other differences as well.

So, now you see that there are a lot of differences between disks, even



though they are the same size (imagines just old Amstrad users who even use different types of disks!) the C128 has to be able to read many formats as possible to be able to make the best use of CP/M. To do this a novel solution was found.

## The Solution

In the past, Commodore computers used 35 (or 77 for older machines) tracks, GCR, 22 to 16 sectors per track and 256 bytes per sector. This format was designed from the start to be reliable, fast, and make the best possible use of disk space. And indeed the figure of 180K for a single sided, single density, 35 track disk has never been beaten. However, the rest of the world started with very low density disk drives and could only modify their system as the hardware got better.

As you can see, there is no way on earth that an old Commodore drive can read the more standard type of disk. So all you people with 1541s — hard luck. You can use Commodore specific CP/M programs (and there are quite a few available from KPM/C) but you won't be able to access any of the generic CP/M stuff.

Now, to read CP/M generic disks you need to have either a 1370 or 1571. The difference between the two is that the 1571 will read and write to both sides of the disk and the 1370 is only a single sided drive. What this means is whilst you could read some CP/M disks in the single sided drive, you may have to get them specially written or only be able to read half the information. So get a 1571, this is the same drive as the one that is fitted internally into the C128!

The 1571 is 40 track double sided, is capable of FM, MFM, or GCR, and can hold 200K, 400K, or 800K. This last mode is the double sided Commodore GCR format and is only really used by the C128 in Commodore Basic mode and when booting CP/M. 200K is available in FM or single density mode and the 400K mode is MFM or double density mode. These two modes could make the C128 read 80% of all CP/M 2.2 disks ever written, but instead, the most popular one was provided. This still covers the vast majority of CP/M disks, they are

IBM 9 sector 55  
KayPro II  
Osborne 55  
IBM 8 sector DS  
IBM 9 sector DS  
KayPro IV  
Osborne DS  
Epson QX 10

The first four formats can be read by the 1571, all formats can be read by the 1571. It is interesting to note that the IBM 9 sector DS is the same format as used by IBM compatibles when using CP/M-86. This was the Digital Research answer to MS-DOS that never really took off. However, many IBM compatibles retain the ability to read or write disks in this format and so date only numbers are possible. Another side point is that the Amstrad CP/M machines (CPC 464 with disks and CPC 664) and CP/M+ machines (CPC 6128, PCW 8256, PCW 8312) can read and write disks in this format.

## Transient Commands and Friends

Last month I explained the concept and purpose of the transient commands along with some of the simpler ones that are only really extensions of the internal or resident commands. After these come the utility programs that can either be considered as transient commands or as programs in their own right. They are usually used as commands when only one operation is needed, whilst for multiple operation the stand alone program mode is more useful.

The most commonly used, and indeed one of the most useful commands is known by the incredibly informative name of PIP. PIP stands for Peripheral Interchange Program, and has been called 'the most powerful command ever written'. This uses the definition of power that derives from making a list happen from the fastest keystroke possible. However, this is more to do with PIP's convoluted shorthand system than anything else. Effectively, what PIP does is to transfer a file from one device, perform some action on the file (or not as the case may be) and transfer it to another device.

This command is exceedingly useful, has to be included on the system disk, and is rarely even documented in CP/M instructions supplied with any CP/M machine. So

here is the minimum you will have to know to get it going.

## PIPPed at the Post

An mentioned earlier PIP is used to transfer files around. The transient way of using PIP is to be typed 'PIP src' where 'src' is the function that you want to happen. When this is completed or an error occurs you will then drop into the CP/M system prompt (A>). The programmed method of using PIP is just to type 'PIP' on its own. You then get the PIP prompt which is an apostrophe (') followed by the cursor. To use the earlier example, if you typed 'src' after this prompt it will be used upon. The difference is that after it is finished or a recoverable error condition occurs, you will drop back into the '?' prompt ready for another command.

The format for the PIP instructions I will assume from now on that all instruction are following the '?' prompt is 'target becomes source operation'. Either the target or the source can be either a file name or a device and the operations will be detailed later. The file names can support all the wildcards and some decorations that the more complex transient commands have. For the most simple example of the PIP command is the disk copy 'src' = 'dst'. 'src' will copy the contents of drive 'B' to a drive 'A'. Single files, and groups of files can be copied or even renamed. 'src.txt' = 'dst.txt' will change the test file 'src' into the test file 'dst'.

The main use of PIP is to transfer information between devices. 'temp.txt' will accept input from the keyboard and create a quick test file. 'LPT=src.txt' will print out the test file and something like 'RMC=temp.txt' will read information from the serial port (perhaps from another computer) and create a file with it.

However, the most powerful function that PIP has is the operations at the end of each instruction. The examples above will do the transfer with no change in the file being transferred. However, the inclusion of a few letters after the instruction in square brackets can change everything.

Z : This reverses the parity for the 7 bit ASCII files.  
W : Otherwise, this will

IBM 8 sector 55







# Keypad Modifier

*Now you can use your numeric keypad to type in lists of data statements.*

*By Mahmood Hassan Merchant*

The Commodore 128 comes with an excellent keyboard which is complemented by a numeric keypad situated on the right. At first glance this would brighten any programmer's heart. You could be mistaken for thinking that it can be used for keying in data statements. But, on more careful examination, it becomes clear that the keypad has been primarily designed for accounting data entry with "+" and "-" keys. Normal Basic data statements cannot be entered with it. Or can't they?

I realized, that with a little effort, the keypad could be redefined to meet this need. Hence the birth of the Keypad Modifier.

## Purpose

This is a machine language utility which resides at the unused RAM at 5000. This start location is defined in line 40 as variable AID. The value of this can be changed if required and a working version of the program will be POKEd to that location and onwards.

The program redefines the "+" key as DEL. This is useful when you make a mistake in your data statements. The "+" key is located on the top right of the keypad just like the DEL key on the normal keyboard, and this makes it very convenient to use.

The "+" key, when depressed, prints the word DATA on the screen. The

camera, required to separate the numbers in a data statement, is now available using the "=" key. The number and ENTER (or RETURN) keys act as usual.

## Hints on Loading

The Basic loader accompanying the program POKES the data. If you own a disk drive, the loader will generate a binary file with the name you specify. Later, whenever you want to use this utility, just enter: RUN "FILENAME" to load and activate the modifier.

Type owners can enter the built-in MONITOR and save the machine code with: S"FILENAME" (A1+5000)+3067. The machine code can then be loaded with: LOAD "Filename",L1. You should then type NEW and SYS 5000 to activate.

## In Use

The best way to use this utility is to first use the AUTO feature of Basic. Type in the first line number and press space. Now you can forget the main keyboard. Just press the "+" at the beginning of a new line, the number of which will be automatically printed if you are using AUTO. Then enter the numbers pressing "=" to separate them and press ENTER to enter the line. If you make a mistake press "+" to delete. If

## PROGRAM: 128 KEYPAD MOD

```

10 PRINT(CLEAR)    100 KEYP
20 GOTO1000
30 PRINT(LENIN)+0 PRINT "O
400 PRINT"%") DELETES CHAR
ACTIVES"
50 PRINT(1,1) PRINTS DATA"
60 AD=5000:FORI=51000:READ:X
70 X=X+1:FORI=X+1:GOTO1000
80 IF(ENTER)+5000:LOAD=5000+I
90000+0,1+13:FORI=0+7,0
10 IF(ENTER)+5000:PRINT"ENTER I
11 DATA STATEMENTS"STOP
12 INPUTNAME OR DISK CLASH"
13 INPUTNAME
14 INPUTNAME FOR BINARY FILE
15,15:FORI=150,00,1000:FORI=150
1671
17 PRINT"TYPE, RIGHT"=5000+150
18+5000+150" TO LOAD AND A
CTIVATE"END
19 PRINT"SYS"AD" TO ACTIVATE"
2000
2100 DATA 100,100,100,100,00,0
2200,00
2300 DATA 100,01,3,000,00,001,0
2400,00
2500 DATA 11,001,03,000,11,000
2600,000
2700 DATA 11,70,100,100,100,00
2800,000
2900 DATA 100,00,000,000,100,0
3000,000
3100 DATA 100,70,3,000,100,00,
3200,70
3300 DATA 3,000,000,00,100,70,
3400,000
3500 DATA 100,00,100,70,3,000,
3600,000
3700 DATA 70,100,100

```



# Go FORTH & \*

*Tired of your old programming language? Want to try something new and exciting? Then it's about time you checked out FORTH.*

*By Allen Webb*

**T**he title of this first article may at first appear odd but it is, in fact, a motto used by the FORTH Interest Group (FIG) meaning "Go FORTH and multiply". What I intend to do is propose some arguments in favour of the use of FORTH as the alternative programming language.

## Basic Disadvantages

The majority of Commodore users are probably programming in Basic. While Basic adequately fills its original function as an aid to teaching programming, it has various drawbacks which hinder its use for serious applications:

- 1) Basic lacks the structural constructs which ease the creation of logical and easily understood programs. If you've ever tried to understand, alter or debug a Basic program written by someone else, you'll know what I mean.
- 2) Being an interpreted language, Basic is both slow and uses memory inefficiently.
- 3) Basic is inflexible.

Two important points must be emphasized. First, the enhanced Basic available to BBC and IBM clone owners are more efficient to use but are

obviously machine dependent. If you want to have a program which is transportable to other machines, forget it. Secondly, you can get compilers which will speed up routines and save space. They do not, however, make the job of programming easier.

For all these reasons, many people will eventually become disatisfied with Basic and will seek an alternative. Those interested in arcade games will generally choose machine code. Those, however, who do not seek the highest speed execution will want an alternative high-level language. For the

604/C126, the alternatives are limited to PASCAL and FORTH. Those of you who own an Amiga will also have the option of CPASCAL (and its derivative MODULA) is a powerful and well structured language but for power, struction, speed and elegance, FORTH takes some beating.

## Forth Advantages

I do not intend to describe the FORTH language in detail since the books listed later will do the job better than I can. Instead, I want to discuss the

```

Listing 1
HEX
DO: CONSTANT SCREEN-COL-REG

:COLOURCHANGE
    [ SCREEN-COL-REG    +1 ]
: FLASH FF 0
    DO
        COLOURCHANGE
    LOOP :
: MESSAGE FF 0
    DO
        "FORTH RULES OK" FLASH
    LOOP :
DECIMAL

```



FORTH philosophy and hopefully whet your appetite.

The main difference between FORTH and other languages is its approach to defining instructions or words. In Basic, instructions such as `MID$, 1, PRINT` etc. have fixed and clearly specified functions or meanings. Whilst FORTH uses a vocabulary of basic words (primitives), they are completely flexible and may be changed at will. If, for example, you want the instruction 5 to meanly represent 11, it is a trivial matter to make the change. This ability to define your own words and add them to the vocabulary gives programming an added dimension. It also makes the creation and use of Procedures both primitive and awkward.

Consider the example in Listing 1.

Here I have defined three words, `COLOURCHANGE`, `FLASH` and `MESSAGE`. Each definition is held in the section between the `:` and `;`. `COLOURCHANGE` increments the screen colour (in `RGB21`) by one. `FLASH` uses a loop to increment the screen colour 120 times. `MESSAGE` uses the flashing screen effect in conjunction with a printed message to give a nasty effect. The three words are added to the vocabulary and can be used in any subsequent words. In other words, a completely user definable language.

If this flexibility wasn't enough, FORTH offers a combination of interpreter and compiler. When you write the program, you are in fact creating some form of text file using an editor. When any word is to be executed, the text is compiled. Since the primitives are efficiently defined in terms of simple machine code jumps, the compiled words are converted to a single linked list of machine code instructions. This results in compact code which executes quickly.

## Inside FORTH

Originally, FORTH was written using virtual memory held on disk. To do this, text is held in a series of screens each comprising of 1024 bytes. When these screens, the text can be laid out in almost any format allowing the use of

indenting and other tricks to give a well structured format as shown in Listing 1. Since many Old users don't own a disk drive, many FORTHS use a RAM-disk approach to storing screens. Whilst the software is different, the perceived mode of operation is unchanged. This system of text input is extremely satisfying since the use of virtual memory on disk presents no penalty for using explanatory comments. Listing 3 shows what can be done.

In terms of capabilities, standard FORTH offers all of the structure you

Much of the speed and power of FORTH derives from its use of a stack to hold values currently in use. Not only does the stack allow the rapid manipulation of data, but values can be easily passed to words. The word `DUP` in Listing 2 is used to duplicate the value at the top of the stack. The functioning of the routine is as follows:

1. The routine is entered with the number on the top of the stack.
2. It is duplicated to preserve it and it is decremented.

### Listing 2

```
: FACTORIAL (n = factorial)
  DUP 1- IF
    DUP 1- MYSELF *
  THEN ;
```

could ask for. The standard constructs are:

```
DO....LOOP
IF...ELSE...THEN
BEGIN....UNTIL
BEGIN....WHILE....REPEAT
```

`CASE` is not standard but can be easily implemented. Using such constructs with the unique "word" system, it is remarkably easy to develop a linear approach to programming without recourse to unsatisfactory constructs such as `GOTO`. In addition, the ability to test words is conducive to the analysis of a problem by use of top-down design.

Here are a couple of further examples. Listing 2 shows a routine for the calculation of the factorial of a number. The routine is recursive in that it calls itself via the word `MYSELF`.

3. If the number is greater than one, the routine calls itself.
4. If the number is equal to one, the results of such call itself are multiplied together.

You might find it interesting to compare Basic routines to do the job to Listing 2.

Listing 3 also uses recursion. Can you sort out what it does?

Listing 4 gives a final example. This time I have a real application. Three example screens are shown for a music system on a Tandy TRS-80 Mk II using an AY-3-8910. Don't try to understand how it works - simply consider how neat the lay out is and how useful a normal program it is. The use of normal English gives a user-friendly program which is easily altered by another user.

### Listing 3

```
: TEST (n = n)
  2DUP <
  IF
    SWAP MYSELF
  ELSE
    DUP 0=
    IF
      DROP
    ELSE
      SWAP OVER MOD MYSELF
    THEN
  THEN ;
```



11. *Journal of the American Medical Association*, 1997; 277: 1001-1005.

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

Words for AF-5-RS10 Programmable Speed Controller

VOCABULARY MUSIC MUSIC DEFINITIONS PAGE # 3- LOAD 1 FSC World

VARIABLE TEMPO		NO TEMPO	
1. ON	2. 1/4 3/4 1/2	1. NO TEMPO	2. NO TEMPO
1. ON	2. 1/4 3/4 1/2	1. NO TEMPO	2. NO TEMPO

```

: PRG) CREATE , INDEX= 0 154 /400
: C flag for use by DATED 5

```

: **NOTED** **NOT** : **EDITED** changes flag value left by a note.

1499	FREQ	C5	1415	FREQ	C60	1355	FREQ	C6
1244	FREQ	C34	1194	FREQ	C3	1113	FREQ	C70
1044	FREQ	F98	1004	FREQ	C8	944	FREQ	A61
881	FREQ	A1	841	FREQ	C41	794	FREQ	C3
749	FREQ	C1	704	FREQ	C81	647	FREQ	C2
630	FREQ	C34	594	FREQ	C1	541	FREQ	FE
529	FREQ	F41	504	FREQ	C1	471	FREQ	A62
444	FREQ	A1	414	FREQ	C2	394	FREQ	C3

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

So you've had the sales pitch and you're looking to start looking in FORTH. There remains the question as to what is available.

First, there is the software. The first point to make is that FORTH users are a sensible lot: when it comes to making systems available and it should be a simple matter to get hold of a public domain system. Try contacting the FORTH Interest Group. Alternatively, there are a few systems which can be obtained free

Probably the most powerful system is White Lightning from Quid. This was marketed as a game package and consequently offers a large number of graphics extensions. Both virtual memory on disk and RAM disk versions are available. Highly recommended.

Mailbox: Home publishes Abner's *THE FORTN* for the 64. This offers some graphics extensions but is otherwise quite standard. Although it is simple to transfer it to disk, only E&M-link is supported.

**ROBIE** (now defunct) offers no bells **FOUNTAIN**. This is quite a decent version and, if you shop around, you may pick it up cheap.

There are also versions from MPE and FORTRAN but I have not evaluated either.

If you're really cool, trendy and looks, you might be able to pick up a

bibliographed but two are worthy of comment. Both are by the same author, Leo Broder: *Searching FOR TV*, Prentice Hall, ISBN 0-13-047957-7; *Thinking FOR TV*, Prentice Hall, ISBN 0-13-817568-2.

Both are worthy additions to any serious computer user's library and great for users of all abilities.

I hope you have found this brief summary of **FORTH** of value. Unlike many languages, **FORTH** has the power and flexibility to grow with your own abilities and provide an effective and elegant solution to your programming programs. 25

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MathWorld Ltd Computing: Science  
House, Histon, St. Cambridgeshire

**FORTM** Interest Group Calls Walk  
54 Wild Briar, Wokingham, Berks  
RG41 1JU

**FORTMONT** 51 Stanley Avenue, St.  
Michael's, Cambridge, ON M2P 2A6

Management Engineering Ltd, 21  
Hawley Road, Shirley, Southampton  
SO9 5AP

McBourne House: High Street,  
Hampton Wick, Kingston-upon-  
Thames, Surrey TW20 6JH

David Software 12 Wall Street 2nd  
New York, New York 10001

Jupiter Ace. For you who haven't heard of it, the Jupiter Ace was a **PORTH** based micro rather in the mould of the **ZX80** (very Boldfield Ltd Comparison).

Unfortunately, the instructions with most low cost PORTHs are poor and must be supplemented by boaters. The range of boats is wide (the PORTH Interest Group has

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725 2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738 2739 2740 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752 2753 2754 2755 2756 2757 2758 2759 2760 2761 2762 2763 2764 2765 2766 2767 2768 2769 2770 2771 2772 2773 2774 2775 2776 2777 2778 2779 2780 2781 2782 2783 2784 2785 2786 2787 2788 2789 2790 2791 2792 2793 2794 2795 2796 2797 2798 2799 2800 2801 2802 2803 2804 2805 2806 2807 2808 2809 2810 2811 2812 2813 2814 2815 2816 2817 2818

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0 NOTE CREATE      0
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                SEAD IF 3 2 " THEN RE (adjust if dotted)
1 +PSG 0 +PSG ON
2: 0 DO LOOP OFF
10: 0 DO LOOP
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250	NOTE	SAVE	110	NOTE	SEMI-REPLY
60	NOTE	REBIN	32	NOTE	CHOTCHET
10	NOTE	CLAWER	8	NOTE	SEMI-CLAWER
4	NOTE	SEMI-SEMI-CLAWER	2	NOTE	SEMI-SEMI-SEMI-CLAWER

**Abstract**

A42	DOTTERD	QUAYER	C2	SEMI-QUAYER	
B42	QUAYER		A42	QUAYER	
C1	QUAYER	A42	QUAYER	B42	CROTCHET
F3	QUAYER	C1	QUAYER	A42	CROTCHET
C3	QUAYER	A42	QUAYER	B42	CROTCHET
B42	DOTTERD	QUAYER	C1	SEMI-QUAYER	
B42	DOTTERD	QUAYER	C1	SEMI-QUAYER	
B42	QUAYER		A42	QUAYER	
C1	QUAYER	A42	QUAYER	B42	CROTCHET
F1	CROTCHET	B42	CROTCHET		
C1	QUAYER	B42	QUAYER		



# Expanding Systems

*Many people who bought the Commodore Sound Expander may have found it too much for their novice status. Perhaps this Music Sales Composer Editor will help.*

*By S.J. Chance*

**D**id you buy a Commodore FM Sound Expander Package rather than this year? Did you thrill to the Country Ranzas III and Tekwar demonstration? Did you then find that your keyboard talents, no matter how great, would not allow you to produce anything sounding half as good as what the machine could play on its own? Dejected, did you give up your Linn or Play Keyboards course, and leave your £150 investment gathering dust under your bed? If you have answered 'yes' to any of the above questions, then here the good news: the long-awaited *Composer/Editor* software for the *Sound Expander* has arrived, and even at the slightly painful price of (\$24.95, it's a must.

At the time of writing, only the disk version was available, and that only with a photo-copy of the instruction manual, but a cassette version should be with it soon.

## The Composer

The disk contains two separate programs: the FM Composer and the FM Sound Editor. I will deal with the Composer first. This allows you to enter standard music notation on to a double staff, over nine channels. The notes can be input from the external five-octave keyboard, nothing new to MIDI fans, but to those of us who have struggled up through *On-Synth*, *The Music Sales*, *The Sound System*, etc., this is a new experience in terms of ease and speed.

Of course, if you don't have the external keyboard, notes can be entered from the computer keyboard, though this is a much more cumbersome way of doing things. Having the computer keyboard operating as a music keyboard does mean that a lot of other functions are relegated to the remaining keys.

Dotted notes, ties, triplets, dynamics, variations in tempo, all are supported by the program, but they are entered via a system of using the function keys to scroll through the options, which I found irritatingly clumsy.

Another minor gripe is that to move the cursor from the beginning of a music file to the end involves a fumbling its way through all the music in between which, with a piece of any length, can take a couple of minutes. The thing to do here is to break the music down into smaller sections with the 'sequence' option.

Repeats in the music are supported, including repeats with different endings, which makes sense to make optimum use of memory space, not that the program doesn't leave plenty of RAM available.

Once entered, your music can be saved (only to disk from the disk version), edited, and dumped to a Printer. The Print-out is more readable than some, and doesn't have the problem of over-lapping quavers appearing to be semi-quavers which occurs with *The Music Sales*.

The music can be played back, in

whole or in part, at any stage, and in any of 64 different voices.

## The Editor

Moving on to the *Sound Editor*, this does exactly what it says it does. The sounds from the existing library can be altered, or new ones created. There are quite a few parameters to muck about with, and you don't have to have a clue what you are doing to get some interesting results. If you are short on inspiration, there is also a *Print Machine* option which outputs the Parameters at random.

The sounds can be played from the external keyboard, and it is possible to set a keyboard-split, in a similar way as with the original *Sound Expander* Package. There are also two extra sets of voices which were omitted from the cassette version of the original *Sound Expander* software.

Also within the editor program is a crude drum machine, using five drums over 32 program steps. This is not as sophisticated in sound or programming as dedicated drum machine add-ons, but is quite respectable nonetheless.

Both the Composer and Editor are MIDI compatible through a relevant interface. If nothing about MIDI has given you a headache in the past, using both these programs with the *Sound Expander* may well open your ears, and eventually your wallet, to the potential that MIDI provides. **TH**



# Letter Writer

*If you write a lot of letters and get fed up of using boring paper and pen, try this novel way to communicate with fellow C64 owners.*

*By Les Allan*

**T**his routine provides a novel way to send a letter, or indeed any form of communication, to a friend or fellow C64 user by providing a musical accompaniment to a tele-text type format.

## Using the Program

Simply type in your letter from the keyboard using all normal print commands to make alterations or emphasis parts of text in different text colours. In fact by experimentation

quite pleasing results can be achieved; the routine can also be used to draw or provide simple animation sequences.

When you are quite satisfied with the finished product hit the P1 key twice to initiate the save process. This relocates the text, music and m/c routine to start of Basic with a relocation program to save a single file of 29 blocks in length.

The program works with either disk or tape; the device being selected by manipulating the current contents of \$DLA.

The program can be further contacted by TURBO CRUNCHing.

The maximum text length is restricted to 4095 which provides sufficient room for most applications.

The program must be typed in exactly as listed and saved prior to running. Error trap routines are included to ensure that the data is read in correct. The program when run stores the relevant code in a temporary address of \$B000 and when prompted relocates the working program to block (\$B000) and saves the program to disk.

PROGRAM: LETTER WRITER	30	30 PRINTFORC64\$B000;"ENDING	67	67 DATA 66,67,68,69,70,71,72,73
05 00 P1=GET\$M;P2=GET\$M;C6=0	31	31 RETURN	68	68 DATA 66,67,68,69,70,71,72,73
07 01 PRINTFORC64\$B000;"P1:"	32	32 FORI=0 TO 65535 STEP 4095	69	69 DATA 66,67,68,69,70,71,72,73
08 02 FORI=0 TO 65535 STEP 4095	33	33 IF P1=0 THEN GOTO 34	70	70 DATA 66,67,68,69,70,71,72,73
09 03 PRINT	34	34 IF P2=0 THEN GOTO 35	71	71 DATA 66,67,68,69,70,71,72,73
0F 14 PRINTFORC64\$B000;"C6:"	35	35 PRINTFORC64\$B000;"C6:"	72	72 DATA 66,67,68,69,70,71,72,73
10 04 DATA 66,67,68,69,70,71,72,73	36	36 DATA 66,67,68,69,70,71,72,73	73	73 DATA 66,67,68,69,70,71,72,73
11 05 PRINTFORC64\$B000;"C6:"	37	37 IF P1=0 THEN GOTO 38	74	74 DATA 66,67,68,69,70,71,72,73
12 06 PRINT	38	38 PRINTFORC64\$B000;"C6:"	75	75 DATA 66,67,68,69,70,71,72,73
13 07 PRINTFORC64\$B000;"C6:"	39	39 DATA 66,67,68,69,70,71,72,73	76	76 DATA 66,67,68,69,70,71,72,73
14 08 PRINTFORC64\$B000;"C6:"	40	40 DATA 66,67,68,69,70,71,72,73	77	77 DATA 66,67,68,69,70,71,72,73
15 09 PRINTFORC64\$B000;"C6:"	41	41 DATA 66,67,68,69,70,71,72,73	78	78 DATA 66,67,68,69,70,71,72,73
16 10 PRINTFORC64\$B000;"C6:"	42	42 DATA 66,67,68,69,70,71,72,73	79	79 DATA 66,67,68,69,70,71,72,73
17 11 PRINTFORC64\$B000;"C6:"	43	43 DATA 66,67,68,69,70,71,72,73	80	80 DATA 66,67,68,69,70,71,72,73
18 12 PRINTFORC64\$B000;"C6:"	44	44 DATA 66,67,68,69,70,71,72,73	81	81 DATA 66,67,68,69,70,71,72,73
19 13 PRINTFORC64\$B000;"C6:"	45	45 DATA 66,67,68,69,70,71,72,73	82	82 DATA 66,67,68,69,70,71,72,73
20 14 PRINTFORC64\$B000;"C6:"	46	46 DATA 66,67,68,69,70,71,72,73	83	83 DATA 66,67,68,69,70,71,72,73
21 15 PRINTFORC64\$B000;"C6:"	47	47 DATA 66,67,68,69,70,71,72,73	84	84 DATA 66,67,68,69,70,71,72,73
22 16 PRINTFORC64\$B000;"C6:"	48	48 DATA 66,67,68,69,70,71,72,73	85	85 DATA 66,67,68,69,70,71,72,73
23 17 PRINTFORC64\$B000;"C6:"	49	49 DATA 66,67,68,69,70,71,72,73	86	86 DATA 66,67,68,69,70,71,72,73
24 18 PRINTFORC64\$B000;"C6:"	50	50 DATA 66,67,68,69,70,71,72,73	87	87 DATA 66,67,68,69,70,71,72,73
25 19 PRINTFORC64\$B000;"C6:"	51	51 DATA 66,67,68,69,70,71,72,73	88	88 DATA 66,67,68,69,70,71,72,73
26 20 PRINTFORC64\$B000;"C6:"	52	52 DATA 66,67,68,69,70,71,72,73	89	89 DATA 66,67,68,69,70,71,72,73
27 21 PRINTFORC64\$B000;"C6:"	53	53 DATA 66,67,68,69,70,71,72,73	90	90 DATA 66,67,68,69,70,71,72,73
28 22 PRINTFORC64\$B000;"C6:"	54	54 DATA 66,67,68,69,70,71,72,73	91	91 DATA 66,67,68,69,70,71,72,73
29 23 PRINTFORC64\$B000;"C6:"	55	55 DATA 66,67,68,69,70,71,72,73	92	92 DATA 66,67,68,69,70,71,72,73
30 24 PRINTFORC64\$B000;"C6:"	56	56 DATA 66,67,68,69,70,71,72,73	93	93 DATA 66,67,68,69,70,71,72,73
31 25 PRINTFORC64\$B000;"C6:"	57	57 DATA 66,67,68,69,70,71,72,73	94	94 DATA 66,67,68,69,70,71,72,73
32 26 PRINTFORC64\$B000;"C6:"	58	58 DATA 66,67,68,69,70,71,72,73	95	95 DATA 66,67,68,69,70,71,72,73
33 27 PRINTFORC64\$B000;"C6:"	59	59 DATA 66,67,68,69,70,71,72,73		
34 28 PRINTFORC64\$B000;"C6:"	60	60 DATA 66,67,68,69,70,71,72,73		
35 29 PRINTFORC64\$B000;"C6:"	61	61 DATA 66,67,68,69,70,71,72,73		
36 30 PRINTFORC64\$B000;"C6:"	62	62 DATA 66,67,68,69,70,71,72,73		
37 31 PRINTFORC64\$B000;"C6:"	63	63 DATA 66,67,68,69,70,71,72,73		
38 32 PRINTFORC64\$B000;"C6:"	64	64 DATA 66,67,68,69,70,71,72,73		
39 33 PRINTFORC64\$B000;"C6:"	65	65 DATA 66,67,68,69,70,71,72,73		
40 34 PRINTFORC64\$B000;"C6:"	66	66 DATA 66,67,68,69,70,71,72,73		
41 35 PRINTFORC64\$B000;"C6:"	67	67 DATA 66,67,68,69,70,71,72,73		
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44 38 PRINTFORC64\$B000;"C6:"	70	70 DATA 66,67,68,69,70,71,72,73		
45 39 PRINTFORC64\$B000;"C6:"	71	71 DATA 66,67,68,69,70,71,72,73		
46 40 PRINTFORC64\$B000;"C6:"	72	72 DATA 66,67,68,69,70,71,72,73		
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48 42 PRINTFORC64\$B000;"C6:"	74	74 DATA 66,67,68,69,70,71,72,73		
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59 53 PRINTFORC64\$B000;"C6:"	85	85 DATA 66,67,68,69,70,71,72,73		
60 54 PRINTFORC64\$B000;"C6:"	86	86 DATA 66,67,68,69,70,71,72,73		
61 55 PRINTFORC64\$B000;"C6:"	87	87 DATA 66,67,68,69,70,71,72,73		
62 56 PRINTFORC64\$B000;"C6:"	88	88 DATA 66,67,68,69,70,71,72,73		
63 57 PRINTFORC64\$B000;"C6:"	89	89 DATA 66,67,68,69,70,71,72,73		
64 58 PRINTFORC64\$B000;"C6:"	90	90 DATA 66,67,68,69,70,71,72,73		
65 59 PRINTFORC64\$B000;"C6:"	91	91 DATA 66,67,68,69,70,71,72,73		
66 60 PRINTFORC64\$B000;"C6:"	92	92 DATA 66,67,68,69,70,71,72,73		
67 61 PRINTFORC64\$B000;"C6:"	93	93 DATA 66,67,68,69,70,71,72,73		
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69 63 PRINTFORC64\$B000;"C6:"	95	95 DATA 66,67,68,69,70,71,72,73		



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SHOULD NOT BE SENT A LETTER, OR SIGNED  
 ANY FORM OF COMMUNICATION, TO A FRIEND  
 OR FELLOW B4 USER BY PROVIDING A PHYSICAL  
 ACCOMPANIMENT TO A TELE-TEX TYPE FORMAT.  
 SIMPLY TYPE IN YOUR LETTER FROM THE  
 KEYBOARD USING ALL NORMAL PRINT CHARACTERS  
 TO MAKE ALTERATIONS OR EMPHASIS PARTS OF  
 TEXT IN DIFFERENT TEXT COLOURS.  
 IN FACT BY EXPERIMENTATION QUITE  
 PLEASING RESULTS CAN BE ACHIEVED; THE  
 ROUTINE CAN ALSO BE USED TO DRAW OR  
 PROVIDE SIMPLE ANIMATION SEQUENCES.  
 USTW



# Red Boxes

*Now there's a home control system available for the C64, which will switch on the kettle and the telly or even warn of intruders.*

*By Mycroft Appleby*

**H**ome control has always been promoted as one of the major uses of computers in the coming years. However, in the past home control systems were expensive, difficult to use, and were only available on micros with good, complex interfacing systems like the BBC Micro. More common computers like the Commodore 64 were not really used at all. One unsatisfied user put that doubled as an RS232, and an obscure custom serial system, isn't really the stuff that interfacing dreams are made of.

Finally, there is now on the market an easy to use home control system that is available across a range of micros including the Commodore 64. The starter pack for *Red Boxes* comprises the main controller — called 'Red Leader', and two control units — an infra-red detector (red box) and a plug actuator (red one). The concept behind the *Red Boxes* is the controller unit 'talking' to all the other units via a modulated serial link via the mains.

Red Leader is a computer in itself. Comprising a 6502 derivative processor just like the C64, 32K of RAM, and a BBC-like control Basic. The Commodore 64 connects to this unit and is used as a terminal. The way this is done is extremely clever. A wire is connected on the C64. Press 'Run/Stop' and the Red Leader behaves just like a cassette player, sending cassette-type signals to the Commodore 64.

After a short time the terminal program is loaded into the computer and the link between the Red Leader and the Commodore 64 turns into a proper two-way serial link. You will then drop into the control program mode.

This mode is the simplest operating method on the *Red Boxes* system (the other being Red Basic, but more of that later). You are presented with a screen where you can log-on devices (i.e. tell Red Leader that they exist) type in their code addresses, turn them on or off and set them up to turn on or off at specific times. You can even route the input of one to the output of another so that a movement on the infra-red detector will activate an alarm for instance.

This program, whilst being extremely simple, is also quite powerful and lets you perform all the major actions that you would want to in a quick and easy manner. However for complex, multi-unit, interactions you need to get down to some planning and programming. For this you need to use Red Basic and probably need to get hold of the Projects Manual (good value at £5).

## Documentation

The manual supplied gives you some simple information on the Basic, but is really aimed at the inexperienced user so goes into more detail about the menu program. The Projects Manual

on the other hand, is one of the better ones that I have read. Going into enough detail for the experienced programmer but to do something really flashy, as the beginner who is an fan with Commodore Basic and wants to get down to using Red Basic.

If you have ever used a BBC micro you will be immediately used to Red Basic as Red Basic is a subset of BBC Basic, with a lot of extra commands added to handle the control aspect of the system. If you think that Red Basic being the same as BBC Basic is a little strange, then you won't when you hear about the Founder of General Information Systems (the people who make Red Boxes), Chris Curry (for it is he) started Acorn many years ago and this is one of the first projects that he has embarked on since the Acorn shake up.

As well as most of the BBC Basic commands and instructions — which includes most of the structured programming aids (repeat, gobble, name, long variable names etc.) there are commands to log-on devices and manipulate them. As this Basic is a lot more advanced than the Commodore 64 Basic, you should have no trouble at all in telling units to do whatever you want, especially with the multi-time commands. These are commands that are very similar to some commands on the Amstrad. Sections of program are executed when an external device instructs them. So if the timer section of your program is controlling the



hearing and a burglar trips the infra-red motion detector than the "alarm" section of your program can be activated.

SK may not sound like a lot, but try and think of the last time that you wrote a program that was actually SK in length. Remember, you don't have to worry about screen or colour memory, or sprites, or sound. The Commodore 64 handles all of that. And if Basic is a bit tight you can always switch to machine code.

The Red Leader uses a 6502 processor, and you can program it in machine code by poking code into memory and then executing it. The Projects manual carries a list of operating system functions which are very similar in a lot of ways to the Commodore Kernal system. The Basic has the same memory management aids as the original BBC Basic with pseudo-variables like Page and Top to indicate when the Basic program is going to sit, and Locom and Mincom to reserve space for the machine code area. The operating system and memory areas are also very similar to the BBC, even down to where the system memory ends.

The Basic can also save any programs written under it to a tape connected to the Commodore 64. To do this, the Red Leader 81m transfers the contents of its memory to the C64. You must then disconnect Red Leader and connect up a tape recorder, and write to tape. Then re-connect everything up.

The main plug of this system is that when you have a program debugged and working to your satisfaction, you can unplug the Commodore 64 from Red Leader completely and use it for something else or whatever. Yet, Red Leader will just sit there executing your program forever. However, you can leave your Commodore 64 connected if you want to — if you need to see information displayed on the screen for instance — though the power consumption over a period of time would be offputting. The Red Leader on its own uses up very little power, and it is flexible to leave it switched on all the time.

### Reds One and Two

The two units supplied with the starter pack are Red One and Red Two (sounds a bit like something out of Apocalypse Now). Red One is the

acquirer. This is a unit that plugs into the mains at one end and then has a mains socket at the other. Anything you like can be connected to this and turned on, and off from Red Leader. There is also a manual override on the unit to toggle it on and off as you see fit. An LED on the box tells you whether it is on or off.

Red Two is an infra-red motion detector. One end plugs into the mains (as usual) and at the other end is a small box about half the size of Red One and Red Leader. In this is a large window. If anything that is at a different temperature than the surrounding air moves within 16 feet of it then a signal is sent back to Red Leader.

All these units come with wall mounting brackets with all screws and Rawlplugs, though they don't need to be wall mounted, it is excellent that these are included. The cables are also very long, over six feet in most cases. This is just about the right length. Usually on systems such as these the cables are not quite long enough. I think that they got it right this time.

In the near future GIS will be releasing an alarm unit and an analog input unit. These will allow you to build up an alarm system more easily or control a thermostat for heating. Next in line are temperature probes and an RS232 kit.

This last unit will allow your computer to talk to a printer in another room, or even another

building, by sending its information down the mains line. This could also be used in networking computers in a simple and easy manner.

If anyone is worrying about the mains system, don't. It is perfectly safe and very well worked out. Each unit has its own unique serial number and the Red Leader has to know what it is. So while you could control your next door neighbour's heating system, you'd have to know his encryption code first. However, if you wanted to communicate with a friend down the road, as long as you were on the same local ring main, and within a few hundred yards, you could do it.

### Verdict

On the whole this is a brilliant system. One of my main interests in computers is in the field of real event control. And this is the nearest to use, safest, and most well thought out system that I have ever seen. This only obstacle in its path are public resistance to this sort of thing, and the price which, though low for a control system, is still high for the average Commodore owner. I will watch this with interest.

### Touchline

*Company: General Informatics Systems, 1 White Hart Yard, London SE1 1RX. Price: £129 (starter pack).*





# Letters

*Your opinions are what counts. Let us know how you feel about anything connected with Commodore computers.*

## Pat on the Back

**M**ay I congratulate you on the new layout and style of *Your Commodore*. It is a great improvement. I am glad to see you have stayed away from the crass in other magazines for catering for games players at the expense of the rest of us. The contents seem to me now to be just about right. The magazine is well laid out, with a good clear typeface and the type is in good average size.

There is only one fault. Did your proof reader once work for *The Guardian*? I ask this as I have spotted a number of typographical errors throughout the magazine.

*Your Commodore* must now go to the top of the class for getting the formula right. I buy most magazines for the Commodore including some American and Canadian ones. *Your Commodore* is now the best for lay out the content.

The free tape has gone into my collection of utilities. I already had most of the utilities but not in two such useful programs. I will be using them often.

As an ancient in my mid-forties, I find using my computer for letter writing and working on a novel (for enjoyment not for publication) very relaxing after a hard day's work on the roads as a council worker. Keep up the good work.

David Pearson, Plymouth

*Thank you for your all too well deserved praise, David (well, why be modest?). Our proof reader has been usually whipped and demoted in ten days and each time as she sets the error of her ways!*

*Ed.*

## Labour of Love

**H**aving recently received my copy of *Your Commodore* January '87, I was interested in an article by Brian Cookin on Fault Finding. I am sure that a lot of readers will find it very helpful.

It was not long after purchasing my first computer that I came up against a problem which I found very frustrating. It was the difficulty of typing in listings without making mistakes. Although I can type about 25 words per minute when writing a letter, it is quite a different problem trying to read the listing and type at the same time. I have to see the keys and see where my fingers are going. Thus when constantly having to stop and read the listing, then remember it, the task could be quite infuriating.

After giving the matter some thought, I devised a method that has worked perfectly for myself, and perhaps it may be of use to others.

I record the whole program on a tape recorder at such a speed that when played back, it allows me to sit comfortably and type merely away without having to take my eyes off the keyboard. If a foot switch is inserted in the control line for stop and start of the recorder it is possible to stop at once correct the mistake, or if the recording has got a little ahead of your typing catch up before operating the foot switch once more.

It does take time to record the listing, but the elimination of constant mistakes in typing and most of all the frustration of continually correcting them, has been a great boon.

I hope that this suggestion will be of value to other readers.

Flight Lieutenant C. Lee RAF (ret'd)  
Harpwood.

*If any other readers have ingenious ideas saving ideas, perhaps they would like to pass on their pearls of wisdom for the enlightenment of the masses.*  
*Ed.*

## Disillusioned

**I** refer to the letter from H. Jenkins in your January issue. I am afraid that I do not share his enthusiasm for the C64/Plus/4 User Club.

Having paid up subscriptions in mid-November, I am still waiting for the so-called 'magazine' for November, December and January. '28 User' did appear in August, September and October as very poor 8" X 8" pamphlets.

Unfortunately, this is not the first time. I have lost out on clubs who start in a blaze of enthusiasm and disappear within a month or so. My experience is probably shared by hundreds of other computer owners whose eagerness is blunted by being ripped off in a similar fashion.

I can only suggest that your readers think twice before parting with their cash, particularly if the publication is not available at a newsagent like your own magazine.

David Jackson, Luton

*We would like to recommend to readers that they check out the reputation of computer clubs as far as possible before parting with any money. If you have any reason or all to doubt the reliability of a club then don't send any money. ACPUG is probably the most well known Commodore club and they may be able to give you information as to specific groups or clubs which they have checked out themselves. Contact: ACPUG, 28 Lancaster Road, Newbury Park, Blyth, Essex NG7 7EP.*



# Double Print

*If you want to attract someone's attention to something, then the bigger the better. This utility allows you to use double height characters on a C64.*

*By Bruce Darent*

When printing text on the screen of a Commodore 64 you are normally stuck with the standard small size character set. Should you require to attract someone's attention to a piece of text then you can change the colour, reverse it etc.

This program, for the C64, makes it possible to highlight your text with double size characters (Hx16) adding a new dimension to your text displays.

The program is written entirely in machine code. The version printed here is presented in the form of a Basic loader which POKs the machine code and the new character set into memory.

Also printed here is a demonstration program which is automatically loaded by the machine code loader.

## In Use

This program makes it possible to have both the new expanded character set and the normal C64 character set on screen at any one time. Switching between the two character sets is extremely easy. Insert a CONTROL-D character into a print statement and the text will appear in double size print. A CONTROL-N character will return things to normal. The demonstration program makes this a little clearer.

The machine code program has four sections.

a) A machine code routine that turns off the interrupts, wedges in the new vectors for the double height program and moves the new character set from \$C000 to \$1000.

b) The new interrupt routine. This looks for raster interrupts at pre-defined lines that correspond to the text lines. When the interrupt occurs the character set and text raster line are set.

c) The new print routine. This first establishes that output is to the screen, then it finds the character set and outputs using the C64's INTERNAL print routine.

d) The new character set. This is initially stored at \$C000 to \$C-A00

and moved by routine (a).

The whole program can be saved as a machine code routine from \$C000 to \$C-A00 provided that any program that uses it moves the start of Basic up to \$1000. Use SYS 49052 to start the program. 75

## PROGRAM:DLPRINT.LOADER

```

80 0 REM *****
81 1 REM *
82 2 REM *      DOUBLE PRINT LO
83 3 REM *
84 4 REM *      COPYRIGHT B.B.DARENT
85 5 REM *
86 6 REM *****
87 7 REM *
88 8 REM *****
89 9 REM *****
90 10 FOR I=0 TO 255:PRINT "P
91 11 PRINT "CHARACTER SET 1: P
92 12 PRINT "PRINT LOADER"
93 13 PRINT "PRINT "
94 14 PRINT "PRINT "
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IN ORDER TO: TO ENTER INTO A CONTRACT TO HOLD DOWN THE... AND... FOR... AND...



# Contributions

*So you own a Commodore? So you've  
written some programs? So why haven't you  
sent them to us?*

**Y**our Commodore is always on the look out for new programs, hints and tips, articles and even regular series. In fact if you have something that you think could be of use to other Commodore owners we want to hear about it.

So if you have got something which you think we may be interested in, How do you go about submitting it to us?

Below you will find a list of guidelines that will help us to deal with any item that you send us to us. We don't expect everybody to be the next William Shakespeare but if you do follow these simple rules then it will make our job a lot easier.

1) If possible all material sent to the magazine should be typed as printed out on a computer printer.

2) All text should be double spaced (i.e. there should be a blank line between each line of text). You should also leave a margin of about 10 characters around the text.

3) On the very first page you should put the following:

Name of the article  
Machine that it is for  
Any extra required - disk, printer etc.  
Your name  
Your address  
Your telephone number

4) The top of every page should have the following information on it:

Abbreviation of the article title  
Your name  
The page number

For example, suppose you had submitted an article on C64 interrupts. You should put something like the following at the head of the page:

Interrupts/J.Smith/1

5) Please make sure that you do not make any additional marks on your text especially underlining.

6) Try and write in clear concise English, it does not have to be a work of literature but it must be comprehensible.

7) On the bottom of each page you should put the word MORE if there are more pages to the article or ENDS if it is the last page.

8) If possible, include a listing of all programs.

9) Under no circumstances use a staple to hold the pages together. Use a paperclip instead.

10) Programs should be included on either disk or tape. Make sure that you SAVE two copies of every program so that we have a better chance of loading them if problems occur.

11) Programs under 10 lines can be included in the text, if your program is longer than this you must enclose a disk or cassette.

12) If your article needs any artwork then supply clear examples of what is needed. We don't expect you to be an artist but we do need to see what is required.

13) Photographs, if necessary, must be either black and white prints or colour slides. We can take them ourselves so don't worry about this too much.

14) Submissions of any length are welcome. If you have a firm line reading that you think may be of use to someone else we welcome it just as much as a full blown six part series.

15) Payment varies quite a lot and depends on quite a number of factors, such as complexity of program, presentation of program, number of magazine pages it takes up etc. Payment is generally between £10.00 and £200.00.

16) All payments are made in the month that the magazine containing your article has appeared in print.

17) If we do find your submission suitable for inclusion in the magazine we will write to you giving the terms of publication, the rate of payment and an agreement form. Please return of this form will allow us to use your program as soon as possible.

18) If you want the program returning to you, should we find it unsuitable for publication, then you should enclose a stamped self addressed envelope.

19) The last and most important point to make is 'get writing', we are waiting for your articles. [E]







## Checksum Program

The hexadecimal numbers appearing in a column to the left of the listing should not be typed in with the program. These are merely checksum values and are there to help you get each line right. Don't worry if you don't understand the hexadecimal system, as long as you can compare two characters on the screen with the corresponding two characters in the magazine you can use our line checking program.

Type in the Checksum Program, make sure that you've not made any mistakes and save it to tape or disk

immediately because it will be used with most of the present and future listings appearing in *Your Commodore*.

At the start of each programming session, load Checksum and run it. The screen will turn brown with yellow characters and each time you type in a line and press the RETURN key a number will appear on the screen in white. This should be the same as the corresponding value in the magazine.

If the two values don't relate to one another, you have not copied the line exactly as printed so go back and check each character carefully. When you find the error simply correct it and

















press RETURN again.

If you want to turn off the checker simply type SYS49153 and the screen will return to the familiar blue colours. You can then do whatever it was you wanted to do and if this doesn't run the area where Checksum lies you can go back to it with the same SYS command.













No system is foolproof but the chances of two errors cancelling one another out are so remote that we believe our listings are more reliable than any other magazine in the world. So get typing!

TD

### Mnemonic Symbol Keypress

[RIGHT]		CTRL left/right
[LEFT]		SHIFT & CTRL left/right
[DOWN]		CTRL up/down
[UP]		SHIFT & CTRL up/down
[F1]		F1 key
[F2]		SHIFT & F1 key
[F3]		F3 key
[F4]		SHIFT & F3 key
[F5]		F5 key
[F6]		SHIFT & F5 key
[F7]		F7 key
[F8]		SHIFT & F7 key
[HOME]		CLR/HOME
[CLR]		SHIFT & CLR/HOME
[RVSON]		CTRL & 9
[RVSOFF]		CTRL & 0

### Mnemonic Symbol Keypress

[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8
[POUND]		£
[LAWROW]		←
[UPARROW]		↑
[PI]		SHIFT & ↑
[INST]		SHIFT & INST/DEL
[REV T]		rev text
[Clear]		COM + clear
[Store]		SHIFT + letter











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H

**Ooops!**

**T**here is a slight correction required in our *Flex Data Entry* program, published March 1983 *Your Commodore*. This only needs to be changed if the start address ends in a one up 0000. Line 645 at present reads:

CH=CH+CA&8

The correct version should in fact be

CH=CH+CA&8

We hope that this will sort out any problems which you may have encountered whilst using this listing.

**Adrian Antics**

*The Growing Pains of Adrian Male*, is not only a popular book and TV series it is deemed also to enter the world of computer games published by the Virgin Games. If you're already currently experiencing the hell on earth, affectionately known as your room, then you may find a lot to identify with in this comedy game. If you left this phase of your life behind a long time ago, then it may serve to refresh your memory.

The game has been programmed by Level 9 in conjunction with Mosiac Publishing and will be available for the Commodore at £9.95.

This month we've decided to run a caption competition in connection with Adrian's growing pains so have a good look at the accompanying picture (published courtesy of Thames Television) and see if you can come up with an apt witty caption to describe Adrian's obvious domestic bliss. The best caption will win £5.

**Bug Finder**

At *Four Commodore*, we try to publish high quality programs that are of benefit to as many readers as possible. This generally means that the programs are often very large and can be prone to typing errors. In order to make your life a little easier, we run a Bug Finder service.

If you have typed in one of our programs and despite much checking, you still can't get the program to run, then send us the following:

Two copies of your program on tape or disk.

A description of your problem.

If possible, a listing of your work (you may omit this).

A stamped, self-addressed envelope for

return of the program to you.

Should any of the above be missing then we will not be able to deal with your query.

We will try to point out where you have made any errors and place a corrected copy of the program back on to your tape or disk before we return it to you.

Do not send a program to us as soon as it stops working. Check it yourself first, if you don't, it only wastes valuable time that could be spent working on the magazine.

We do get a large number of queries in the office, so it may take a little time for yours to be processed.

**Notes** We can only deal with problems concerning programs published in *Four Commodore*.

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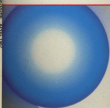
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